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ABSTRACT

These proceedings of a hearing before the Alcohol and Drug Abuse Subcommittee include testimony about the health and educational effects of marijuana on young people. The materials describe recent findings on the extent of drug use among youth, recent changes in drug use trends, and the consequences of marijuana use on health and intellectual functioning. The report also outlines policies and programs of the National Institute of Drug Abuse. The effects of drug use on driving, reproduction, motivation, moods and behavior are discussed. The testimonies include suggestions on how the government can assist parent groups, and what kinds of behaviors and attitudes parents and teachers should watch for when drug abuse is suspected. The statements of witnesses such as psychiatrists, U.S. senators, pediatricians, substance abuse prevention program coordinators, and a pharmacologist are also included. (JAC)

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HEALTH AND EDUCATIONAL EFFECTS OF MARIJUANA ON YOUTH

HEARING

BEFORE THE

SUBCOMMITTEE ON
ALCOHOLISM AND DRUG ABUSE

OF THE

COMMITTEE ON
LABOR AND HUMAN RESOURCES
UNITED STATES SENATE

NINETY-SEVENTH CONGRESS

FIRST SESSION

ON

EXAMINATION OF THE HEALTH AND EDUCATIONAL EFFECTS
OF MARIJUANA ON YOUTH

OCTOBER 21, 1981

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HEALTH AND EDUCATIONAL EFFECTS OF MARIHUANA ON YOUTH

WEDNESDAY, OCTOBER 21, 1981

U.S. SENATE,
SUBCOMMITTEE ON ALCOHOLISM AND DRUG ABUSE,
OF THE COMMITTEE ON LABOR AND HUMAN RESOURCES,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 4232, Dirksen Senate Office Building, Senator Gordon J. Humphrey (chairman of the subcommittee) presiding.

Present: Senator Humphrey.

OPENING STATEMENT OF SENATOR HUMPHREY

Senator **HUMPHREY**. Good morning.

This morning, the Alcoholism and Drug Abuse Subcommittee will hear testimony on the health and educational effects of marihuana on youth. I want to thank our witnesses for generously giving of their time and coming a great distance at their own expense to share with Congress, the public, and their colleagues their findings on this important subject.

Marihuana use is widespread among our young people. The results of the 1980 survey of high school seniors indicated that 60 percent of high school seniors have used marihuana at some time during their life, 49 percent reporting some use in the past year, and 34 percent reporting some use in the past month. In addition, marihuana is used on a daily or near-daily basis by a substantial fraction of the seniors.

These statistics have fostered justified concern over the effects of this use and a desire for authoritative answers to questions about it. As with any developing area of research, we realize that all the authoritative answers are not yet available. However, it is imperative that the public and its legislators have the most up-to-date material available on which to base their decisionmaking.

At a previous hearing, Dr. Pollin has told this subcommittee that recent high school surveys have shown that although adolescent marihuana use increased steadily between 1975 and 1978, the 1979 survey has shown a leveling off of use, and 1980 has shown a small decline.

On that score, I have had the staff prepare a chart, which is over here on my right, and it is one which is certainly encouraging, to say the least, and one that we hope is indicative of the beginning of a long-term decline in at least substantial use of marihuana by our high school students.

There have also been some significant changes in the attitudes of young people toward marihuana which lend further credibility to these prevalence results and suggest that the downward shift in marihuana use may continue. Much of the change appears to be due to increasing concern about possible adverse effects from regular use and the perception that peers are now more disapproving of regular marihuana use.

This change has occurred during a period in which a substantial amount of media attention has been devoted to the hazards of heavy marihuana use. Parents groups, such as the National Federation of Parents for Drug-Free Youth, PRIDE, and many other grassroots organizations have been active in creating a network for disseminating up-to-date information about marihuana use and research findings to teenagers, parents, schools, and community groups, and we certainly applaud their efforts.

Because it appears that the dissemination of information about the dangers of marihuana has contributed to the recent change in the attitude and decline in marihuana use by high school seniors, it is essential to continue to gather and publish accurate and up-to-date health and educational information.

Because the American marihuana experience has been of relatively brief duration, it is not yet possible to be definitive in our answers to many of the health questions that marihuana use raises. As our experience with tobacco and alcohol demonstrates, it frequently requires many years of use by large numbers of individuals for the more subtle effects of a drug to become apparent.

Based upon the scientific evidence available to date, we have good reason to be concerned about the hazards of marihuana use, and it is clear that one cannot responsibly conclude at the present time that marihuana is a safe or benign substance.

I have seen for myself, as we all have, the tragic results of drug abuse in wasted potential, isolation, and unhappiness. In the relatively short time research has been conducted on the effects of marihuana, studies have shown that marihuana use interferes with memory, intellectual functioning, motivation, and driving ability. We will hear testimony this morning on the detrimental effect of this interference on classroom performances and the educational process.

We will explore today the research which has already been done on the effects of the drug on the reproductive system, the brain, lungs, and heart. We will then look at the areas which still warrant further exploration.

It has been a couple of years since the Congress has held public hearings on this subject. Many earlier studies were conducted on animals or involved adult users of marihuana at a time before the recent marked increase in potency of street marihuana.

Because large numbers of young adolescents are becoming marihuana users, we will focus today on the effects this use has had on their health and on their attitudes and behavior at this crucial time of their lives and how it changes their educational experience.

We have invited a distinguished panel of experts here today–scientists from the National Institute on Drug Abuse, research scientists, clinicians, and educators—to bring us up to date on the latest findings on the health and educational effects of marihuana on youth. We hope that they will not only evaluate the latest research for the subcommittee, but will also suggest a course for future research and prevention efforts.

In closing, let me say that the subcommittee is here to listen, to learn, and to ask hard questions whenever they are appropriate. We are here to work together to address the problem of marihuana by our young people, to assess research priorities, and to establish positive directions in the search for information. Continued research on the effects of marihuana use and the vigorous dissemination of new knowledge acquired through research remains the best hope we have for fighting this serious drug problem.

We will now receive for the record statements from Senator Hatch and Senator Denton.

[The prepared statements of Senators Hatch and Denton follow:]

PREPARED STATEMENT OF SENATOR HATCH

Senator HATCH. Mr. Chairman, I congratulate you on your leadership and foresight in organizing these hearings today. Marihuana use by the young people of this country is a cause for increasing alarm as we come to understand the serious detrimental effects this drug can have on the school performance and on the short-range and long-range health of our Nation's young people.

Rather than being a benign and harmless substance, as has been claimed by those who advocate marihuana use, this substance has been found to produce serious health problems in those who use it. We need to let the press, the Congress, and the parents and youth of America know what recent findings have shown about marihuana.

A forum such as this is a significant contribution to the commitment of the chairman of this subcommittee, and the commitment of the full Committee on Labor and Human Resources to make the public aware of the danger of marihuana.

Mr. Chairman, you have my full personal support for your efforts to show the real consequences of marihuana. I am impressed with the distinguished list of panelists who will testify this morning and I pledge to you the backing of the full committee in these efforts. We will all look forward to studying and understanding the data presented today, and we will look forward to developing plans of action which will reduce the heavy toll we are paying for marihuana abuse in our country.

PREPARED STATEMENT OF SENATOR DENTON

Senator DENTON. Thank you, Mr. Chairman, for calling this hearing. It is evidence of the genuine concern that you have over a problem which continues to threaten our youth, their families, and their communities.

In my opinion, one of the greatest mistakes which society has made over the last two decades is underestimating the serious consequences of marihuana use. Too much time lapsed and too many lives were endangered while we either spread misinformation about the psychological and physiological effects of smoking marihuana or refused to question loudly enough the validity of that information. I want to welcome Dr. Pollin and acknowledge that NIDA-sponsored research over the last few years, in particular, has provided us with firm ground on which to counteract the notion that marihuana use is safe.

Today's hearing is important because it provides us with another public forum for spreading the sobering results of drug abuse research and another opportunity to help dispell the substantial portion of this safety myth which remains. Fifty percent of high school seniors still believe that marihuana use is not harmful. This hearing also gives the subcommittee a chance to say that, notwithstanding drug enforcement, research and information dissemination are appropriate and vital roles for the Federal Government to play in the battle against substance abuse.

I feel compelled to say that I am concerned about the overall health and lifestyle of adolescents. Over the last 80 years, all age groups in our country have shown consistent improvement in health with one exception—Americans aged 15 to 24. In the last 20 years, this group has experienced an increase in their death rate—the death rate of American adolescents has increased 15 percent since 1960—half of all their deaths result from accidents, including automobile accidents. Homicide is the second leading cause of their deaths, and suicide the third. I believe it is safe to say that drugs contribute, to some extent, to deaths in each of these categories.

I fully recognize the need to concentrate on discouraging illicit drug use. I believe that the parents and peer groups which have sprung up and the quality literature which is now available are just the ammunition it takes to win the war. But I also know that we are fighting a number of individual battles against enemies that threaten the lives of America's youth. For this reason we must also take an integrated approach to health promotion among teens. We must try to discourage all behaviors which pose long-term health risks to this developing generation—drug abuse, cigarette smoking, alcohol consumptions, and premarital sexual relations.

I think we can infer a significant conclusion from looking at the makeup of the panel of witnesses assembled here—pediatricians, researchers, educators, parents, policymakers. It will take a partnership of determined individuals from many orientations to achieve a victory over the marihuana problem or any of the other disturbing problems which confront America's youth. I hope we can look back on the 1980's and claim with pride and great relief that we have succeeded.

Senator HUMPHREY. Our first panel this morning is comprised of Dr. William Pollin, Director of the National Institute on Drug Abuse; he is accompanied by Dr. Jack Durell, Acting Deputy Director of the National Institute, and Dr. Marvin Snyder, Director of the Division of Research.

Gentlemen, good morning. Dr. Pollin, you have a statement. What is your preference? I know it is important. Do you want to read it in full? Of course, it will be included in full, irrespective. Or do you prefer to highlight it?

STATEMENT OF WILLIAM POLLIN, M.D., DIRECTOR, NATIONAL INSTITUTE ON DRUG ABUSE; ACCOMPANIED BY JACK DURELL, M.D., ACTING DEPUTY DIRECTOR, NATIONAL INSTITUTE ON DRUG ABUSE; AND MARVIN SNYDER, PH. D., DIRECTOR, DIVISION OF RESEARCH, NATIONAL INSTITUTE ON DRUG ABUSE

Dr. POLLIN. Mr. Chairman, with your permission, I would prefer to highlight and summarize my testimony.

Senator HUMPHREY. Very well; proceed as you wish.

Dr. POLLIN. Mr. Chairman, thank you for the invitation to discuss this important issue—the health and behavioral effects of marihuana on youth. I welcome the opportunity this hearing provides to publicize NIDA's view of the dangerous effects of marihuana on young people and to restate our policy of urging young people to avoid use of this drug.

In my written statement and the summarized version that I will present this morning, I would like to consider four major areas: The extent of marihuana and drug use among our youth, the recent change in marihuana and drug use trends, what we know at the present time about the consequences of marihuana, and what we have done and propose to do in response to the problem.

First, as to the extent of the problem, NIDA has two principal, current sources of information about the incidence and prevalence of marihuana use by young people—our annual national survey of high school seniors and our biennial national household survey. The high school senior survey is conducted by the University of Michigan's Institute for Social Research and has studied a large sample of high school seniors each year since 1975. In 1980, over 16,000 seniors in 107 public and 20 private high schools throughout the country participated.

The national household survey, since 1971, has provided estimates of the prevalence of drug abuse in the total U.S. population, including young people, rather than focusing exclusively on one narrow age segment.

It should be emphasized that for methodological reasons, these surveys do not study the highest-using subgroup of youth—those who have left home and school. Their data are, nonetheless, extremely useful because of their continuity, the reliable trends they reveal, and their consistency with other surveys, local, State, and national, which we also monitor.

Based on these sources, the following figures give some indication of the extent of current youthful drug use in this country.

Approximately two-thirds of high school seniors report ever having used any illicit drug—60 percent marihuana, 39 percent an illicit drug other than marihuana. Six in ten have used marihuana at least once; 1 in 10 use it daily or more often.

High school seniors are a key group, but the majority of youthful users begin use much earlier—3 out of 10 at the junior high school level or younger. Of this younger age group, over 6 million young people between the ages of 12 and 17 have tried marihuana at least once, and one-half of these younger users say that they have used marihuana 5 days or more in the past month.

Mr. Chairman, these statistics are of great concern to us and to most Americans, and very properly so. They exemplify and merely touch on a few selective highlights of what I believe constitutes a very serious problem: A pattern of extensive drug use by young teenagers—a pattern which did not exist in this country at all 25 years ago.

Further, in the view of our most experienced survey researchers, we have now and continue to have, despite recent optimistic trends, the highest level of marihuana and other drug use among our young people of any developed country in the world.

Given this alarming rise over the past several decades and the current high level of use, I am pleased to report today the early indications that we have previously discussed of a gradual decrease in marihuana and other drug use which may be occurring among young people.

In 1980, 9.1 percent of high school seniors reported daily marihuana use. This represents a decrease from 10.7 in 1978 and 10.3 in 1979. Preliminary 1981 figures continue to show the same downward trend. If confirmed, and I believe they will be, this will be the third consecutive year of decline after an unbroken climb of many years 'duration.

The same surveys demonstrate that daily use of cigarettes peaked 2 years earlier and then began the same slope of decline, and that daily use of alcohol peaked 1 year later and in the past year has also begun to show a decline.

There are multiple possible reasons for this decrease, and they probably include the increasing awareness of the negative health consequences among these users and a decrease in perceived peer acceptance of regular marihuana use. The proportion of seniors attributing great risk to regular marihuana use has risen close to 50 percent in the last 2 years, and the proportion who think that their close friends would disapprove of such use increased 10 percent for the first time in 1980.

In addition, it is obviously of great significance that after several decades of very uncertain, ambivalent, and somewhat hopeless community and parental reactions, there has begun to be much more vigorous and focused community action and much more vigorous and focused reaction on the part of parents and parent groups.

The positive changes may well be indicative of basic, underlying changes in national attitudes, and also the population structure. Previous research has shown a relationship between drug use and age. The highest percentage of drug abusers by far fall into the 18- to 25-year-old category.

Demographic projections clearly indicate that this age group will decline between now and 1995 in actual numbers and as a percentage of the population. An 18-percent decrease is what is being projected by demographers.

Accordingly, it has been predicted that the number of adult drug users—young adult drug users, in particular—will also decline. In one sense, these projections are conservative. They are based on the assumption that the size of the vulnerable age cohorts would decrease, but that use within a given cohort would remain constant. However, the trends we have described above show a more optimistic tendency—namely, a decreasing level of use within a given age cohort.

One substantial warning is necessary at this point. Whenever we describe positive trends in this field, we must keep two points clearly in mind—the historical tendency for many drug-use patterns to move up and down quite unpredictably, as the past has shown, and that even with the current improvement, as pointed out before, our drug-use levels continue to be unacceptably high.

As you pointed out in your opening statement, Mr. Chairman, our understanding of the health consequences of marihuana is still incomplete. But, clearly, the data available demonstrate a series of significant risks and dangers.

Our surveys enable us to measure the relationship between use of marihuana and use of other drugs, and in recent years also have allowed us to obtain data concerning the self-perceived consequence of marihuana use by the users themselves. Let me summarize some of these data and then take up the findings from the large and growing number of other research studies which have investigated specific questions concerning marihuana's properties and effects.

With respect to the relationship between marihuana and other drugs, marihuana users tend to use other drugs to a significantly greater degree than nonusers. The earlier marihuana use begins and the heavier it becomes, the stronger the tendency to use other drugs is.

Some examples: among high school seniors who use marihuana daily, four times as many report daily alcohol consumption; twice as many report daily tobacco use; four times more are current amphetamine users, and six times more are current cocaine users than are all high school seniors.

A similar picture is derived from a separate, important survey of a representative nationwide sample of 2,500 young men aged 20 and 30, by O'Donnell Clayton et al. They found that whereas less than 1 percent of their subjects who had never used marihuana went on to use cocaine and heroin, of those who had used marihuana 1,000 times or more in their lifetime—that would be the equivalent of 3 years' daily use—three-quarters, or 73 percent, went on to use cocaine and one-third went on to use heroin.

O'Donnell and Clayton, after analyzing their own data and several other large, major surveys, concluded that the stepping stone hypothesis—namely, the possibility that a significant causal relationship exists between use of marihuana and use of other so-called hard drugs—was rejected prematurely by the scientific community and justifies serious reevaluation at the present time.

Their analyses also showed a significant relationship between non-drug-related criminal activities and marihuana use. For example, whereas only 6 percent of their nonusers were involved in breaking and entering, 27 percent of those using marihuana 1,000 times or more were so involved.

A second significant source of data concerning the health consequences of marihuana are the self-perceived consequences of such use by its users. High school seniors who are daily marihuana users believe that the use of the drug may have caused them to experience significant problems, such as the following:

Forty-two percent report less energy; 34 percent report that they believe that the use of marihuana hurt their school and/or job performance; 31 percent indicate less interest in other activities; 28 percent report that the drug causes one to think less clearly; 38 percent think that it hurts relationships with parents; and 11 percent think that it has caused them to be less stable emotionally. We cannot accept these figures as precise measures of marihuana effects comparable to results observed by clinical researchers. Nonetheless, I think they are particularly significant given the well-documented tendency of drug users to deny negative consequences.

As I will mention subsequently, there continues to be some contradictory findings in studies which attempt to document the existence of the so-called amotivational syndrome—one of the most important possible consequences of marihuana use. My own view is that these contradictory findings are primarily the result of continuing methodological problems which are to be expected at this stage in marihuana research, but that we should pay particularly strong attention to the fact that marihuana users themselves, to a very significant degree—at least one-third of them—are describing many of the individual components of what has commonly been described as the amotivational syndrome.

The third major source of our knowledge of health and behavioral consequences of marihuana use results from specific clinical or preclinical studies. Such research can be grouped into nine key areas: effects on intellectual functioning; driving and skills performance; cardiovascular effects; pulmonary effects; the immune response; central nervous system effects; psychopathology and behavioral changes; reproductive and endocrine effects; and chromosome and cellular changes.

Last year, NIDA reviewed the current state of knowledge concerning these areas in the eighth annual marijuana and health report to the Congress. Currently, extensive and comprehensive reviews are in the final stages of completion at the collaborating World Health Organization Center at the Addiction Research Foundation in Toronto, and by the Institute of Medicine here in Washington.

My prepared statement gives summary evaluations for each of these areas. In the interest of time, let me condense them here, keeping in mind that the important questions we need to concern ourselves with are: do changes occur due to marihuana in any of these areas, and if changes do occur, what is their significance?

With regard to intellectual functioning, there is no scientific difference of opinion that significant, acute changes of many different types do occur and that impairment clearly takes place. The kinds of changes which occur—the impairments, the difficulties with short-term memory, and so forth—clearly have the potential for a destructive impact on school performance by those individuals who are using marihuana daily during school hours, as many daily users do.

With regard to chronic or irreversible changes in this area, more research is needed. Many of the studies have yielded negative results, but there are a small number of recent Canadian studies in animals which are disturbing to me because of the finding of irreversible changes.

Second, with regard to the area of driving and skills performance, again, clear evidence of definite impairment is shown, and there is no scientific disagreement as to the existence of such impairment. Again, more research is needed to measure the precise effects, the extent of impairment and, as an example, what percentage of accidents that occur may be clearly related to marihuana. Some such percentage clearly does exist.

Cardiovascular effects: There are definite effects and there is no scientific disagreement in this area. However, negative effects appear to be, at this point, most relevant to older-aged populations or to individuals with concurrent heart disease, and their significance for youth, if any, has thus far not been demonstrated.

Pulmonary effects: Again, they are clearly present. These include impairment of certain important functions, such as vital capacity and pathological changes which are typical of a variety of chronic respiratory diseases such as bronchitis and the like.

The issue of cancer risk is a very real one. The level of carcinogens in marihuana is considerably higher than that in tobacco, and there is thus far considerable indirect evidence of a significant cancer risk. However, no animal model has thus far demonstrated, either for marihuana or tobacco, the definite appearance of lung cancer.

Nonetheless, based on what we know about marihuana and the comparison with smoking patterns and the effects of tobacco, my personal view is that the risk is very real and significant, but related to the extent, intensity and length of use.

The immune response: Given the key role that the immune response plays in basic body defense mechanisms against all disease, this is a very important area. In animal studies, impairment is shown consistently. In human studies, the data and findings tend to be contradictory. Thus far, the clinical significance of these findings is unclear.

Let me mention in passing that when we speak of contradictory findings, that should in no way be seen as an unusual event or any criticism of the scientific process. Such difference of opinion as to the existence or the significance of observations is par for the course and is a necessary and inevitable part of the process of scientific discovery. I know of no health field and no significant medical advance in which such controversy did not exist. Even, for example, with respect to the development of the polio vaccine—one of the great success stories of modern medical research—there were long periods of controversy about safety and comparative efficacy of attenuated live viruses versus dead inoculation material, and so forth.

Psychopathology and behavioral change: There is considerable agreement on the existence of significant, acute responses, including acute anxiety attacks, paranoid reactions, and in some cases psychotic decompensations.

With regard to more chronic changes and the type of change I referred to before, such as the amotivational syndrome, at the present time we can summarize the state of knowledge by saying that clinicians who deal with disturbed adolescents frequently and in large numbers describe such changes and express a high level of concern about them; you will hear some such accounts later this morning. Structured, controlled clinical trials thus far have shown various results—unclear, contradictory results—in attempting to document this particular issue.

With regard to changes in the central nervous system, there also have been contradictory reports. Early reports of gross, major anatomical changes have not been confirmed. More recent reports of microscopic changes, which could be of even greater significance, have not been replicated. It is an area which clearly needs more research.

In the area of reproductive and endocrine effects, again we find definite changes with regard to levels of hormones, the anatomy and function of sperm, and reproductive cycles in the female. Again, there is some difference with regard to human and animal studies with these findings being much more consistent in animal studies. Again, the clinical significance of the findings needs more study.

Finally, in the area of chromosome and genetic effects, early human findings of marked chromosomal damage have not been replicated. There do continue to be certain positive cellular studies describing what may be significant changes. The significance is as yet unclear.

Thus, in seven of these nine areas, I would conclude that anatomical and/or physiological changes definitely occur; that in five of these areas, the changes are of clear clinical significance, but the full extent of this significance remains to be determined. I am referring to the areas of intellectual functioning, driving and skill performance, behavioral changes, pulmonary changes, and reproductive and endocrine effects. In the two areas of changes in the immune respond and in the cardiovascular system the clinical significance for youth still remains to be determined.

Marihuana research—and this is on page 19 of the statement, Mr. Chairman—is a young scientific field. In all probability, more marihuana research has been done in the past two decades than in all previous history. The National Institute on Drug Abuse has been the major sponsor of such studies. Support has included stimulation and funding of research grants, research contracts, and growing and standardizing the direct supply of marihuana and the cannabinoids for research studies.

Total Federal support for research on marihuana since 1977 has remained rather constant, at slightly more than $4 million a year, with 11 different agencies contributing. NIDA's proportion of this funding amounts to over four-fifths of the total.

The goals of marihuana research during the 1980's vary somewhat from those of the 1970's. During the 1970's, emphasis was placed on prevalence studies and on identifying and understanding the acute effects of marihuana. In the 1980's, though these interests continue, more attention is being paid to the issue of the chronic effects of marihuana use, particularly on women and adolescents. These populations have not been well represented in past research focused on health consequences. What effects, if any, are irreversible is another key research question.

There is a need to support longitudinal studies of young people, particularly the heavy users. As mentioned, it is the daily user and the user who begins marihuana use early who are most at risk for future general health, social and psychiatric problems.

In this content, it is important to point out that up to this time, the bulk of marihuana studies have attempted very carefully to separate out the specific effect of marihuana itself on various biological and psychological processes. This is indeed a crucial question, but it can become too narrow an approach.

Marihuana, particularly in young people, is often part of a lifestyle and part of a pattern. Identifying the consequences of the lifestyle of which marihuana use is a part is at least as important as learning the effects of marihuana per se.

In summary, Mr. Chairman, in the key area of marihuana use by youth, NIDA's major goal: is to contribute to the reduction of the use of marihuana by our young people. A coordinated effort will provide the best possibility of continuing the reversal of the pattern of sharp increases that we have seen until very recently.

To achieve this goal, we plan, within the constraints of resource availability, to: First, continue to support research that will provide more information about long-term health and behavioral consequences of marihuana use by young people; second, continue to develop and implement effective means of warning young people, their families and the Nation about the negative consequences of marihuana use; and, third, continue to encourage and support the private sector, and the parent groups, in particular, to continue their work toward discouraging marihuana use by young people.

Mr. Chairman, our young people have been the tragic victims of a major public health menace—the sudden explosion of multiple drug use by teenagers during the past two decades. This change has had potentially very grave consequences for their personal future and for the Nation's future. There is some reason to believe that this picture of exploding drug use has leveled off and may be beginning to decline. We all share the serious responsibility of insuring that this decline continues and accelerates.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Pollin follows:]

Statement of

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before the

Subcommittee on Alcoholism and Drug Abuse
Committee on Labor and Human Resources
United States Senate

on

Health and Educational Effects of Marijuana on Youth

Wednesday, October 21, 1981
10:00 A.M.

Mr. Chairman, thank you for the invitation to address the important issue of the health and educational effects of marijuana on youth. I welcome the opportunity this hearing provides to publicize the dangerous effects of marijuana on young people and to restate the National Institute on Drug Abuse (NIDA) policy of urging young people to avoid the drug.

In my written statement and the summarized version that, I will with your permission present this morning, I want to consider four major areas:

1) The extent of marijuana and drug use,
2) Recent changes in drug use trends;
3) The consequences of drug use; and
4) What we have done, and propose to do, in response to the problem.

EXTENT OF THE PROBLEM

NIDA has two principal sources of information about the incidence and prevalence of marijuana use by young people. These are our annual National Survey of High School Seniors and our biennial National Household Survey on Drug Abuse.

The National Survey of High School Seniors, conducted by the University of Michigan's Institute for Social Research, has studied a large sample of high school seniors each year since 1975. In 1980, 16,524 seniors in 107 public and 20 private high schools throughout the country participated in the research.

The National Household Survey on Drug Abuse is a NIDA-funded household study conducted by the George Washington University since 1971, that provides biennial estimates of the prevalence of drug abuse in the population of the United States. The 1979 results are based on 7,224 face-to-face interviews including 2,165 youth, 12 to 17 years old. The national data we report does not cover the highest using subgroup of youth--those who have left home and school. These data are, nevertheless, extremely useful because of their continuity, consistency with other local surveys, and the trends they reveal.

Among the most important findings, based on the 1979 and 1980 High School Senior Survey and the 1979 National Household Drug Abuse Survey are these:

Incidence and Prevalence (Table 1)

- Nearly 65 percent of high school seniors report ever having used an illicit drug; 39 percent report having used an illicit drug other than marijuana.
- Sixty (60) percent of high school seniors report ever having used marijuana.
- Over 7 million young people between the ages of 12 and 17 say they have tried marijuana at least once. This figure represents 31 percent of this age group.
- Over 9 percent of high school seniors report daily use of marijuana.
- Among youth aged 12 to 17 who report current marijuana use, 50 percent say they have used marijuana 5 days or more in the past month.
- Thirty-one (31) percent of high school seniors report that their initial experiences with marijuana occurred prior to high school, primarily in the 7th, 8th, or 9th grades, presumably between the ages of 12-14.

Mr. Chairman, these statistics are of great concern to us and to most Americans, and properly so. They portray a serious problem--extensive drug use by young teenagers--which did not exist in this country three decades ago. In the view of our most experienced researchers, we now have the highest level of marijuana and other drug use among our young people of any developed country in the world.

Given this alarming level of use, I am pleased to report today that there are indications that a gradual decrease in marijuana use is occurring among young people. In 1980, 9.1 percent of high school seniors reported daily marijuana use; this represents a decrease from 10.3 percent of the seniors who reported daily marijuana use in 1979 and from 10.7 in 1978. Our preliminary 1981 figures continue to show this downward trend. This drop follows a period of dramatic increase. It now appears that 1978 and 1979 were the key years in which the dramatic rise in marijuana use among high school students leveled off. This gradual decrease may be attributable to increasing health concerns and to a decrease in perceived peer acceptance of regular marijuana use. Certainly the parents groups have played a significant part. The proportion of seniors attributing "great risk" to regular marijuana use has risen 50 percent in the last 2 years, and the proportion who think their close friends would disapprove of such use increased 10 percent for the first time in 1980. The 1980 data also reveal slight drops in annual marijuana use (down 2 percent) and monthly marijuana use (down 3 percent). Although these are not large decreases, they are statistically significant and may be indicative of a basic underlying change. They certainly are in definite contrast to the rapid rise which took place up until 1978.

Previous research has shown that there is a relationship between nonmedical use of drugs and age, and we know that the highest percentage of drug abusers fall into the 18 to 25 year-old category. Demographic projections indicate that this age group will decline between now and 1995 in actual numbers and as a percentage of the population. Accordingly, it also is projected that the number of young adult drug abusers will decline. The one exception to this prediction is the fact that the nonwhite populations between the ages of 18 and 25 are not projected to decrease. They are expected to increase between now and 1995.

Predictions about the age group of 12 to 19 year-olds call for even more caution because of slightly different demographic trends. A 6-percent decrease is expected for 10 to 14 year-olds between now and 1990; a 19-percent decrease is expected for 15 to 19 year-olds for this same period. If our hypothesis holds true, then we also will see a decline in drug abuse by our school-aged youngsters over the next few years. The caveat is that an increase, over the 1985 population, is anticipated for this age group by 1995. If we experience a decrease in drug abuse between now and 1990, this may offset the anticipated population increase that would occur between 1990 and 1995. We will continue to monitor these trends as time goes on and make every effort to decrease the use of marijuana by young people.

It should be emphasized that these projections are conservative, based on the assumption that the size of age cohorts would decrease, but that use within a given cohort would remain constant. However, the trends we have described this morning show, fortunately, a more optimistic tendency--namely, a decreasing level of use within a given age cohort.

One substantial warning: whenever we describe positiye trends in this field, we must keep two points in mind--the historical tendency for many drug use patterns to move up and down, unpredictably; and that even with current improvement, how high our drug use levels continue to be.

Consequences of Marijuana Use

Our understanding of the consequences of marijuana is incomplete, but clearly the data demonstrate a series of significant risks and dangers. Our surveys enable us to measure the relationship between use of marijuana and use of other drugs; and in recent years also have allowed us to obtain data concerning the self-perceived consequences of marijuana use by users themselves. Let me summarize some of these data, and then take up the findings from the large and growing number of other research studies which have investigated specific questions concerning marijuana's properties and the effects of its use.

First, let me describe the relationship between use of marijuana and use of other drugs.

Marijuana and Other Drugs

- Marijuana users tend to use other drugs, to a significantly greater degree than nonusers. The earlier marijuana use begins, and the heavier it becomes, the stronger this tendency is. Some examples are as follows:

- Twenty-seven (27) percent of those high school seniors who report daily marijuana use also report daily alcohol consumption versus only 7 percent for this age group as a whole.

- Fifty-nine (59) percent of high school seniors who report daily marijuana use report daily tobacco smoking versus only twenty-five (25 percent) for the age group as a whole.

- Forty-seven (47) percent of high school seniors who report daily marijuana use report that they are current users of amphetamines, generally four to seven times the average for the age group as a whole.

- Thirty-one (31) percent of high school seniors who report daily marijuana use report that they currently use cocaine, generally five to seven times the average for this age group as a whole.

A particularly valuable additional survey is "Young Men and Drugs: A Nationwide Survey." This survey is an extensive and meticulous study of a representative nationwide sample of 2,510 young men, aged 20-30, by O'Donnell and Clayton, et al. They found, for example, that whereas less than 1 percent of these young men who had never used marijuana went on to use cocaine and heroin; of those who had used marijuana 1,000 times or more, three quarters or 73 percent went on to use cocaine, and one-third (33 percent) went on to use heroin. O'Donnell and Clayton conclude, in a paper now in press, that the stepping-stone hypothesis--namely, that a significant causal relationship exists between use of marijuana and use of other so-called hard drugs--was rejected prematurely and now needs serious reevaluation. Their data also reveal a significant relationship between nondrug-related criminal activities and marijuana use. For example, only 6 percent of nonusers were involved in breaking and entering, whereas 27 percent of those using marijuana 1,000 times or more were so involved.

Perceived Consequences of Marijuana Use

- High school seniors who are marijuana users believe that the use of the drug has caused them to experience significant problems such as the following: (Table 2)
  - Forty-two (42) percent report they have less energy.
  - Thirty-four (34) percent report that they believe regular use hurt their school and/or job performance.
  - Thirty-one (31) percent indicate they are less interested in other activities.
  - Twenty-eight (28) percent report that regular use has caused them to think less clearly.
  - Thirty-eight (38) percent think that regular use hurt their relationship with their parents.

- Eleven (11) percent think that regular use caused them to be less stable emotionally.

ADDITIONAL HEALTH AND EDUCATIONAL CONSEQUENCES

Mr. Chairman, I now would like to review with you the results of specific research studies which present either clear evidence of the danger of marijuana use, or raise sufficiently serious questions so that one must withhold judgment and emphasize the potential risk of such use. The research can be grouped into nine key areas:

1. Intellectual Functioning
2. Driving and Skills Performance
3. Cardiovascular Effects
4. Pulmonary Effects
5. The Immune Response
6. Brain Damage Research
7. Psychopathology
8. Reproductive Effects
9. Chromosome Abnormalities

1. Intellectual Functioning

Interest in the psychological and cognitive impairment that may result from marijuana goes back many years with the first systematic accounts of intellectual performance occurring in the 1930s. A wide range of intellectual performance impairment related to marijuana intoxification has been reported. Impairment has been observed on such tasks as digit symbol substitution (a timed task in which the individual substitutes a series of symbols for numbers), choice reaction time (a reaction-time task in which the response depends on rapidly discriminating between choices), the ability to repeat in forward and backward order a succession of digits, and to mentally make a succession of repeated subtractions. Many other task performances, including concept formation, reading comprehension, and speech also have been found to be impaired. There is no significant difference of scientific opinion concerning these observations and conclusions.

Research shows that more familiar, less demanding tasks are less interfered with than those involving new material and more difficult task requirements. A common denominator to impairment of functioning is the effects of marijuana on short-term memory. Marijuana interferes with the transfer of material from immediate to longer term memory storage.

Dozens of experimental studies now exist whose results consistently show that while marijuana's acute effects on memory and cognition vary with the task and the amounts of drug used, the impact almost invariably is detrimental. What is less clear is the extent of long-term effects due to chronic long-term use. This is an important area in which additional research is required.

2. Driving Performance

Because the ages of peak marijuana use coincide with those of peak driving accident rates, and such accidents are the principal cause of death and injury in adolescents and young adults, the impact of marijuana on driving is an important public health issue.

There is good evidence that marijuana use, at typical social levels, impairs driving ability. Studies involving such diverse areas as perceptual components of the driving task, driver simulator performance, test course and actual driving behavior, all tend to show significant performance and perceptual deficits related to being high that make driving more hazardous.

In addition to NIDA supported research in this area, additional studies conducted for the National Highway Traffic Safety Administration also demonstrate that marijuana probably was used by a significant percentage of drivers involved in fatal accidents and in driving while intoxicated (DWI) arrests. A study reported in 1979 by the California Department of Justice, Office of Traffic Safety, found 16 percent overall incidence of THC in the blood samples of 1,792 persons stopped by police for driving while intoxicated. That proportion rose to nearly 25 percent for the group within the sample without alcohol present in their blood.

More marijuana users drive today when high than was true in the past. Surveys indicate that from 60 to 80 percent of the marijuana users questioned reported that they sometimes drive while high. Marijuana use in combination with alcohol also is quite common, and the risk of accidents when the two drugs are used in combination is greater than that posed by either drug used alone.

Another alarming danger associated with driving under the influence of marijuana is that some of the perceptual or other performance decrements resulting from marijuana use may persist for some time, beyond the period of subjective intoxication. Under such circumstances, the individual may attempt to drive without realizing that his or her abilility to do so is still impaired even though he or she no longer feels "high." Ongoing studies are attempting to further delineate these issues.

In this context, it is important to note the present status of our ability to detect cannabinoids in body fluids. The abilility to detect marijuana use is important to deterring the use of this drug by young people. There has been steady progress in the development and improvement of research assays for cannabinoids in body fluids using the techniques of radioimmunoassay (RIA) and gas chromatography/mass spectrometry (GC/MS). These methods are highly sensitive and specific, but because of their sophistication, their use has been primarily limited to research laboratories. Recent modifications in the RIA assays, however, have led to the availability of kits which have wide applicability to the analysis of blood, plasma and urine by laboratories with less research experience than previously required.

The most important recent advance in urinalysis of cannabinoids for the determination of past use of marijuana was the commercial distribution of the EMIT system 1-1/2 years ago. The development of this system was partially funded by NIDA. Initial large-scale tests of this system show it to be a highly accurate and useful technique for the determination of past use of marijuana. It can detect cannabinoid metabolites in urine for as long as 1-2 weeks in some individuals after a single smoking session and perhaps as long as 3-4 weeks after a chronic smoker has stopped.

Research is being supported on the development of rapid and less expensive laboratory tests for cannabinoids in saliva and blood which could form the basis of forensic assays for recent past use of marijuana. Within the past few months, a portable version of the EMIT system which promises to have wide applicability in "field use" has begun to be marketed. The problems with such a system include the confirmation issue and the relatively high expense of this type of assay, but in prevalence studies and in field use which can incorporate confirmation by other methods, it should prove highly useful. It will provide the first rapid and accurate chemical measure of drug use in military populations which were not accessible before because of the lack of a portable system.

The EMIT does not presently permit one to measure or time a possible state of intoxification; instead it confirms use or nonuse within the recent past. Therefore, it cannot currently, conclusively link driving violations or accidents to marijuana use, as is done with the breathalizer for alcohol and subsequent blood tests. However, we continue to support the further development of this and other tests that will determine more precisely recent marijuana use.

3. Cardiovascular Effects

Studies on the cardiovascular effects of marijuana have not been conducted with very young populations, i.e., individuals under the age of 21. However, it is known that marijuana use leads to an increased heart rate and associated circulatory changes. There is evidence that in patients with already impaired heart function the use of marijuana may precipitate chest pain (angina pectoris) more rapidly and following less effort than tobacco cigarettes. This possible difference in the response to marijuana in heart disease patients may prove to be of considerable practical significance, if young people presently using marijuana continue to use the drug as they progress through middle life.

4. Pulmonary Effects

The danger that marijuana may present to the lungs and to the respiratory system is linked to the fact that marijuana typically is smoked, often by individuals who also smoke tobacco cigarettes. It has been shown that cannabis produces 50 percent more tar than the same weight of standard tobacco cigarettes. Also, because most of a marijuana cigarette or "joint" is consumed by the smoker, more tar is inhaled than when an ordinary tobacco cigarette is smoked. In addition, cannabis tar contains more than 150 complex hydrocarbons, including carcinogens such as benzo(a)pyrene. The concentration of benzo(a)pyrene in marijuana tar is 70 percent higher than in the same weight of tobacco tar. There does not yet exist an animal model for the development of lung cancer by either tobacco or marijuana. However, in animal tests marijuana smoke residuals produce skin tumors. In fact, human lung tissue exposed in the test tube to marijuana smoke shows greater cellular changes than when exposed to similar amounts of standard tobacco smoke. Critical longitudinal studies are needed and are being supported by NIDA to evaluate the risk of long-term use.

In addition to possible cancer risk, marijuana smoke has been shown to seriously impair important pulmonary functions; vital capacity, for example, is significantly decreased, more so by two or three typical joints than by one pack of tobacco cigarettes. It also causes changes typical of a variety of lung ailments. At this juncture, it is not possible to predict what precisely the health effects in later life will be on those young people today who are regular marijuana smokers. As with cigarette smoking, it may take at least 20 years to document results.

5. The Immune Response

Because of the importance of the body's natural defenses against illness, principally the immune response, reports of an impairment of this vital function must be carefully considered.

The T-lymphocyte is a white blood cell which plays a central role in the immune response. Some human studies have described an effect on T-cell function under conditions of chronic heavy marijuana use; others using different techniques have failed to confirm this observation. Such discrepancy is almost universal at this stage of research inquiry and will be clarified by further studies.

Animal data more consistently have reported a definite suppression of the test animals' immune responses. Three reports based on work in laboratories have reported reductions in the immune response in mice and rats treated with high, but humanly relevant, doses of inhaled marijuana smoke.

There has been no large-scale epidemiological research undertaken as yet to determine if marijuana smokers suffer from infections and other diseases to a greater extent than others of a similar lifestyle who do not use the drug.

6. Brain Damage Research

It is not possible to make definitive statements regarding the relationship between marijuana use and brain damage. Several studies indicated that brain atrophy might be present in heavy users; however, these studies have methodological flaws that prevent the drawing of any concrete conclusions. There is no evidence at this time which links marijuana use to any single specific neurologic illness. Some experiments indicate the possibility that some subtle changes in brain functioning or structure may occur as a result of marijuana smoking. However, these studies were conducted with a limited number of animals and have, thus far, not been confirmed by others. Moreover, the dose levels used may not be applicable to most human usage. Additional research is needed, particularly with regard to any subtle changes in brain functioning that may occur as a result of marijuana use.

7. Psychopathology

There is a general consensus that we need to know more about the psychological/psychiatric effects of marijuana use on youthful drug users. Young people are believed to be especially at risk because of their ongoing physical and emotional maturation. It is possible that young, regular marijuana users may not be able to develop appropriate "life" skills on schedule, and that failing to do so, it may be difficult if not impossible for them to make up these developmental differences later in life. There is increasing clinical concern that some percentage of regular heavy daily users develop a psychological dependence on marijuana to the extent that it interferes significantly with their maturation.

The most commonly observed adverse clinical reaction of marijuana use is the acute anxiety reaction. This reaction appears to be more common in relatively inexperienced users, although the degree of dose also can play a role. More severe reactions occur more frequently, but not exclusively, in individuals with pre-existing psychiatric disorders. These range through paranoid states to psychotic decompensations.

An acute brain syndrome associated with cannabis intoxication including such features as clouding of mental processes, disorientation, confusion and marked memory impairment also has been reported. This acute brain syndrome appears to be linked closely to the dose and quality of marijuana.

In attempting to elucidate the role marijuana plays in psychopathology, it is difficult to isolate marijuana from the many other potential contributing variables, such as other drug use, latent psychopathology, and normal developmental crises. However, at least one recent study raises the possibility that drug use may be one of the intervening variables that causes psychological/social pathology among some youngsters. Robbins has reported that youngsters coming from families with less pathology became like the youngsters from families with known pathology; these children came to exhibit the same anti-social and disturbed behavior that normally would be associated with the latter type of family. This 1980 study found that early adolescent drug use often occurred in youngsters whose early school records indicated a better than average IQ and who came from families of an economic status similar to other families from the school class. The author found that, contrary to what one might have predicted based on school and family background, these youngsters came to resemble the typical child with a behavior disorder, with a lower IQ, from a more economically deprived family, and who had been cited for truancy and failure in school. A possible intervening variable may have been the early onset of drug use.

8. Reproductive Effects

A variety of both animal and human studies suggest that marijuana used daily and in substantial amounts similar to those of a regular cigarette smoker may impair some aspects of the reproductive function.

Some studies show that the male hormone testosterone may be reduced temporarily as a result of marijuana use. Abnormalities in the sperm count and motility and in the structural characteristics of sperm of male chronic users have been found. Animals studies of the effects of marijuana on testicular functioning, including the production of sperm, also have found adverse effects.

Preliminary evidence from animal and human studies suggests that relatively heavy marijuana use, ranging from several times a week to daily use, may reduce fertility in some women. Endocrine changes have been found in several studies. While the clinical implications of such findings are not yet known, and the acute effects noted may be reversible when marijuana use is stopped, they do indicate a basis for concern for long-term users as decreased fertility may result, especially in those of already marginal fertility.

Recent animal studies using high but relevant doses of marijuana or THC have indicated a variety of possible reproduction problems. These include early death of embryos and their reabsorption, reproductive losses being higher among marijuana-treated rhesus females than among nontreated females, lower birth weight of male infants born to treated female monkeys, and reductions in ovary and uterine weight, estrogen production, and the production of a number of important pituitary hormones.

One study of 26 females who used "street" marijuana three or more times a week for 6 months or more found that these women had three times as many abnormal menstrual cycles in which they failed to ovulate as nonusing women. Lowered levels of prolactin, a hormone important after childbirth in producing adequate mother's milk, also were found, suggesting that nursing might be impaired in marijuana-using women following childbirth. Because the marijuana-using women also used alcohol more extensively than the nonmarijuana-using group, it cannot necessarily be assumed that the effects observed were the result of marijuana use.

There is good evidence that THC and other cannabinoids pass through the placental barrier and reach the fetus during intrauterine development. Pre- and postnatal changes related to marijuana use have only been found with larger doses in animals and have not been reported in humans, but the distinct possibility exists that marijuana use during pregnancy might result in abnormal development.

Research directly concerning the effects of marijuana on human reproduction is limited; however, there appears to be enough evidence to at least warrant cautioning against the regular use of marijuana during pregnancy.

9. Chromosome Abnormalities

Overall, there continues to be no convincing evidence that marijuana use causes clinically significant chromosome damage. Although there were early reports of increases in chromosomal breaks and abnormalities in human cell cultures, more recent studies have been inconclusive.

PAST EFFORTS-FUTURE DIRECTIONS

Marijuana research is a young scientific field. In all probability, more marijuana research has been done in the past two decades than in all previous history. The National Institute on Drug Abuse has been the major sponsor of such studies. Support has included stimulation and funding of research grants, research contracts, and growing and standardizing the direct supply of marijuana for research studies. Total Federal support for research on marijuana since 1977 has been slightly more than $4 million a year, with 11 different agencies contributing. NIDA's proportion of this funding amounts to over four-fifths of the total. A history of NIDA's expenditures on marijuana research since FY 1975 can be seen in Table 5.

The goals of marijuana research during the 1980s vary somewhat from those of the 1970s. (Refer to Table 6 for a summary of marijuana funding by research goal.) During the 1970s, although NIDA was interested in supporting a broad-based attempt to understand the problem of marijuana abuse, emphasis was placed on prevalence studies and on identifying and understanding the acute effects of marijuana. In the 1980s, though these interests continue, more attention is being paid to the issue of the chronic effects of marijuana use, particularly on women and adolescents. These populations have not been well represented in past research focused on health consequences. What effects, if any, are irreversible is another key question.

The Institute also would like to see more studies oriented towards identifying and developing successful prevention and treatment approaches to youthful marijuana use. Approximately 18 percent of all individuals who enter Federal drug abuse treatment programs list marijuana as their primary drug of abuse. Of this 18 percent, over 41 percent are under the age of 18. Our data system cannot tell us the exact nature of the client's complaint nor the clinician's diagnosis. In order to provide more effective treatment, we need to know more about the problems caused by marijuana that result in a youngster seeking help.

There is a need to support longitudinal studies of young people, particularly the heavy users. As mentioned, it is the daily user and the user who begins marijuana use early who are most at risk for future general health, social, and psychiatric problems. In this context, it is important to point out that the bulk of marijuana studies attempt very carefully to separate out the specific effect of marijuana itself on such phenomena as the body, ego-identity, personal values, and the like. This is indeed a crucial question, but it can become too narrow an approach. Marijuana, particularly with young people, is part of a lifestyle, part of a pattern. What are the consequences of the lifestyle that often accompanies marijuana use? If most heavy marijuana users typically use several drugs, identifying the consequences of multiple drug use is as important as learning the effects of marijuana per se.

I believe future research on marijuana use and youth will emphasize (1) basic and clinical research with an emphasis on identifying chronic health and behavioral consequences, (2) applied research with an emphasis on determining effective treatment modalities, and (3) prevention research with an emphasis on identifying the mechanisms that prevent or inhibit young people from experimenting with marijuana.

Mr. Chairman, let me now turn from the topic of research; I want to emphasize the need for involving the non-Federal sector in the prevention and treatment of marijuana use by young people. The Block Grant program will allow States the flexibility they need to determine how best to approach the problem of marijuana use and youth. Working together, States, local governments, and parent groups should be able to determine what is the best approach for their particular community. The Federal Government will continue to provide technical assistance and will disseminate the latest research information about the effects of marijuana use. Our major goal is to reverse the current pattern of marijuana use and get us back to a period where marijuana use once again is a rare phenomena. I cannot emphasize enough the tremendous change that has occurred since the 1950s in this country. This last 20-year period in which we have seen such a tremendous increase in marijuana use, particularly by young people, is unprecedented.

In an effort to promote non-Federal involvement in the prevention and treatment of marijuana use by young people, NIDA recently sponsored a symposium on the clinical effects of marijuana use on young people; we shall continue to support family and parents drug prevention workshops. These workshops are designed to promote interaction and collaboration among parent groups, single State agencies, the drug abuse treatment system, and the prevention community.

In summary, I want to emphasize that NIDA's goal is to contribute to the reduction of the use of marijuana by young people in this country. A coordinated effort will provide the best possibility of reversing the pattern of sharp increases we have seen until very recently. The following are our recommendations for achieving this goal:

1. Continue to support research that will provide more information about long-term health consequences of marijuana use by young people,

2. Continue to develop and implement effective means of warning young people, their families, and the Nation about the negative consequences of marijuana use; and

3. Continue to encourage the private sector and the parent groups in particular to work towards discouraging marijuana use by young people.

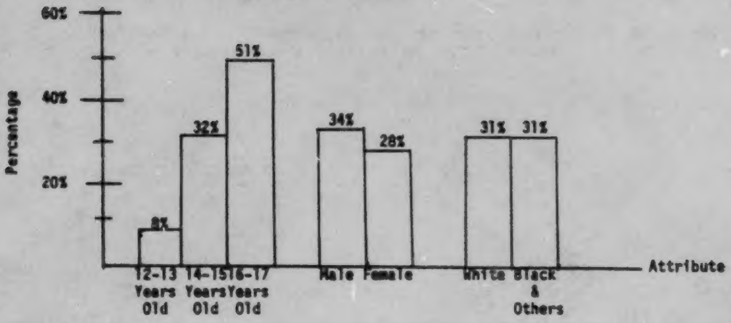
Mr. Chairman, our young people have been the tragic victims of a major public health menace during the past two decades, one which has had potentially very grave consequences for their personal future and the Nation's future. There is some reason to believe this picture of exploding drug use has leveled off and may be beginning a decline. We all share the serious responsibility of ensuring that this decline continues and accelerates.

Thank you, Mr. Chairman. I would be happy to respond to any questions you may have.

Table 1

NATIONAL HOUSEHOLD SURVEY ON DRUG ABUSE, 1979

Lifetime Prevalence Of Marijuana Use
Among Subgroups Of Youth*



Of Total Sample 31% (N=700) Have Used Marijuana In Lifetime**

Of Lifetime Users 54% (N=350) Are Current Users (Consumed Marijuana In Past Month)**

Of Current Users 50% (N=175) Have Consumed Marijuana 5 or More Days In Last Month**

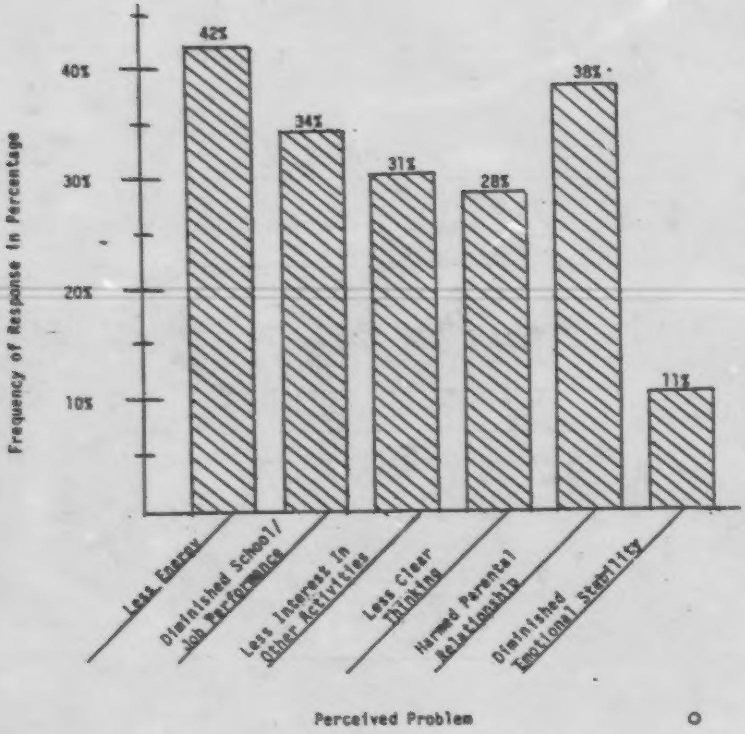
* N= 2,165 Total Sample, Age 12-17

**N= Approximate Figures Based Upon Weighted Percentages

Table 2

NATIONAL SURVEY OF HIGH SCHOOL SENIORS, 1979

Perceived Problems Resulting from Marijuana Use as Reported By High School Senior Daily Users in Frequency of Response



N= 1,230

Table 3

YOUNG MEN AND DRUGS: A NATIONWIDE SURVEY, 1976

Lifetime Prevalence Of Criminal Activities Correlated With Marijuana Use*

Criminal Activities	Marijuana Use				
	Never Used	Under 10 Times	10-99 Times	100-999 Times	1,000+
Selling Drugs	4%	6%	19%	50%	71%
Shop-lifting	29%	50%	52%	56%	64%
Breaking & Entering	6%	10%	10%	20%	27%

* N= 2,500

Table 4

YOUNG MEN AND DRUGS: A NATIONWIDE SURVEY, 1976

Lifetime Prevalence Of Other Drug Use
Correlated With Marijuana Use*

		Marijuana Use				
		Never Used	Under 10 Times	10-99 Times	100-999 Times	1,000+
Other Drug Use	Cocaine	Less than 1%	1%	7%	39%	73%
	Heroin	Less than 1%	1%	4%	13%	33%

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* N= 2,500

TABLE 5

PERCENTAGE OF NIDA RESEARCH BUDGET EXPENDED ON MARIJUANA RESEARCH
(Dollars in Thousands)

	FY 75	FY 76	FY 77	FY 78	FY 79	FY 80
RESEARCH BUDGET	34,046	33,760	33,994	33,986	42,930	45,972
CANNABINOID RESEARCH EXPENDITURES	4,483	2,853	3,940	3,594	3,536	3,788
TOTAL CANNABINOID PROJECTS	105	82	75	64	65	53
MEAN CANNABINOID PROJECT COST	42.70	34.79	52.53	56.17	54.40	71.47

TABLE 6

NIDA MARIJUANA PROJECTS BY RESEARCH GOAL

FY 1978 Through FY 1980
(Dollars in Thousands)

	FY 1978	FY 1979	FY 1980
Epidemiology	238	54	61
Etiology	145	133	136
Prevention Research	77	--	48
Hazards of Marijuana Use	916	990	1,236
Treatment Research	54	51	132
Basic Research	972	1,295	1,036
General Research & Development (Chemistry, Drug Supply & Technology Transfer)	1,194	1,013	1,139
TOTAL	3,594	3,536	3,788

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Senator **Humphrey**. Thank you, Dr. Pollin, and I know that everyone certainly shares your hope that this leveling off and slight decline is the beginning of a long-term, favorable trend. Let me commend you and your staff at the Institute for your important part in this progress. Certainly, your Institute has been one of the foremost factors involved in educating the public, I would say, and I congratulate you on that.

Perhaps it would be well at this point, before I ask you a number of questions that come to mind regarding your testimony—it might be well if you would state the formal role of the National Institute on Drug Abuse. It is our Nation's chief facility for investigating the effects of drugs, obviously. Perhaps you could put it more formally than that, just to put it into focus.

Dr. **Pollin**. Until very recently, Mr. Chairman, our role actively involved a number of separate areas. One, we had a primary responsibility for developing a national treatment capacity to meet the results of the exploding use of drugs in this country over the past several decades.

Late in the 1960's, there were just a handful of outpatient treatment centers in the country and two prison hospitals. This past year, there were over 3,200 separate drug abuse treatment facilities; more than 1,500 of those received funding which came from NIDA and went through the States.

We had a second responsibility to train the sudden, huge increase in the number of people required to staff that treatment system. Both of these efforts largely achieved their goals in terms of developing this kind of national treatment capacity. This year, along with many other categorical health programs, NIDA's role will change as the funding for this type of community service becomes part of the block grant mechanism.

Senator **Humphrey**. Yes.

Dr. **Pollin**. Second, we have had a major role in planning, stimulating, and conducting knowledge development activities, including basic and applied research, and in attempting to bring researchers who had previously been successful in more recognized and established fields of research into drug abuse research.

Both in terms of the individuals involved and in terms of the results achieved in the sense of important breakthrough findings, and we think that there has been important progress made during the past decade.

We also, increasingly in the past few years, have put greater efforts into major prevention efforts both with regard to national campaigns, attempting to effectively spread our view of the problems and dangers of drug abuse, and to help stimulate the growth and activity of more effective community and parent organizations in this area.

Senator **Humphrey**. Thank you for that.

Regarding the marihuana epidemic, if you will, you stated that 25 years ago, there was very limited use of marihuana, and then very rapidly usage grew to the point that today, notwithstanding these fairly favorable trends, young people in the United States are the heaviest users of marihuana in any industrialized country. Is that correct?

Dr. **Pollin**. Yes.

Senator HUMPHREY. That is a pretty remarkable statement. Are other industrialized countries close to us in the use of marihuana by young people, or are we, unfortunately, way out ahead?

Dr. POLLIN. This is an area where we have to rely upon the informed judgment of the most experienced researchers in the field due to the fact that there are no other countries that have anything that even approaches the kind of national data sources that we have.

It appears that a number of countries in Western Europe have come close to our levels of marihuana use. There are certain societies in the world, primarily in underdeveloped countries, where very widespread use of marihuana has been a cultural tradition for long periods of time. But use in those areas is usually in small segments of the population where very heavy marihuana use occurs, and there is a very different system of social constraints and the like, so that those underdeveloped countries are really not comparable.

Senator HUMPHREY. I see. Regarding the studies that have been conducted over the last 10 or 15 years, I recall that the critics of those studies pointed to contradictions and pointed to the preliminary nature of many of those studies. But, now, we have been studying the health effects of marihuana for a number of years. Is it your opinion that we now have a sufficient body of evidence to warrant serious concern and that there no longer can be any serious challenge to the general thrust of these findings?

Dr. POLLIN. I believe that very strongly, Mr. Chairman.

Senator HUMPHREY. Very strongly?

Dr. POLLIN. Yes. Insofar as we talk about marihuana effects on young people, I do not know of anyone who now believes that this is a benign drug to be treated in a cavalier fashion.

Senator HUMPHREY. You know of no professionally qualified person who considers marihuana to be a benign drug?

Dr. POLLIN. Certainly not in young people; certainly not in adolescents.

Senator HUMPHREY. You mentioned the preliminary findings of the 1981 high school senior study. When will that study be available?

Dr. POLLIN. The end of November.

Senator HUMPHREY. The end of November.

The downtrend we see on this first chart reflects use by daily users. What is the trend by occasional users?

Dr. POLLIN. It shows the same trend lines, with one exception. If you look at lifetime prevalence, which means any use, even using one time at any point in one's life, that kind of pattern continues to show some very slight increase in the most recent studies. That is a kind of use which is of much less concern and has much less significance with regard to health or behavioral effects. But if you look at all measures—use during the past year, use during the past month, or daily use—all of these are now trending down.

Senator HUMPHREY. You did not, in your very comprehensive and excellent statement, touch upon the matter of increased potency and increased strength of marihuana which is now available. Can you give us, from NIDA's point of view, some commentary on that and the significance of that increased potency?

Dr. **Pollin**. Its significance takes several different forms. First, the average potency some years back was on the level of 1 to 2 percent, and we are talking here about the percent of the most psychoactive component of marihuana in the material as a whole.

Senator **Humphrey**. Yes.

Dr. **Pollin**. The standardized preparation of marihuana which is used, worldwide in all studies was developed at that time and still continues to have that same level of potency. There are standardized marihuana cigarettes for research purposes at different levels of potency, but they are still all within that general level.

Given the fact that there are strains of marihuana currently available whose potency is three, four or five times as high as the average of some years back and that such marihuana is frequently used at this point by our young people, we are, for the moment, in the unfortunate situation of studying the health effects through the use of a preparation which we know is very much at the low end of the kind of marihuana that is being used in the country as a whole.

Senator **Humphrey**. You say your research is based on marihuana whose potency is at the low end of the range?

Dr. **Pollin**. That is right. At some point in the future, we do plan to make available material of higher potency. We already have begun to move in that direction. There are a number of technical difficulties with doing that.

So, just from the point of view of evaluating the large body of structured research studies which are done today, we have to recognize that their results will have a built-in predilection toward yielding conservative findings.

Senator **Humphrey**. I see.

Dr. **Pollin**. The other major implication of this change in potency is that young people, to the extent to which they continue to smoke at approximately the same level now that they were smoking 5 years ago—and we have no definitive evidence of there being a change in the level of this pattern—that is, a reduction in smoking to compensate for the increased potency——

Senator **Humphrey**. Yes.

Dr. **Pollin**. To the extent to which those patterns remain the same, they are experiencing a material which is three to four times stronger.

Senator **Humphrey**. So, those who are smoking at the same level of past years, in fact, are ingesting a greater quantity of the psychoactive agent today by virtue of the increased potency?

Dr. **Pollin**. Substantially greater.

Senator **Humphrey**. Substantially higher?

Dr. **Pollin**. Yes.

Senator **Humphrey**. And in your view, the potency has increased by three or four times over the last 10 years, is that correct?

Dr. **Pollin**. Yes.

Senator **Humphrey**. And the research that has been done in recent years is based largely on that weaker marihuana, so that, if anything, the health effects——

Dr. **Pollin**. Tend to be understated.

Senator **Humphrey**. Yes.

You have shown the correlation between use of marihuana and other drugs. Is anyone prepared to say whether this is a cause and effect relationship?

Dr. POLLIN. Not conclusively. There seems to be no reason, first, to believe that it is in any sense a biological cause and effect relationship. There are a number of hypotheses which suggest behavioral scenarios, if you will, by which the use of marihuana would facilitate and make more likely the use of other drugs.

If we think for a moment about a literal meaning of what a stepping stone is, enabling one to cross some natural divide that might be a lot more difficult to cross over if that stepping stone were not there, many of those scenarios involve just that concept.

I agree with Dr. Clayton and the late Dr. O'Donnell that that hypothesis deserves to be reexplored, given the much greater amount of epidemeological data available.

Senator HUMPHREY. You made the statement that those who used marihuana 1,000 times or more—that is, regular daily users—of that group, three-quarters went on to use cocaine. That is a pretty shocking statistic and one that ought to be considered by young people. Whatever the relationship, the result is pretty amazing and pretty shocking. And one-third of those who used it daily went on to heroin.

Dr. POLLIN. And I find it even more impressive when one looks at the data and sees that of those who do not use at all, only 1 percent go on to the use of these other drugs.

Senator HUMPHREY. Yes.

In your statement you indicate that a significant causal relationship exists between the use of marihuana and other so-called hard drugs. That assertion was rejected out of hand prematurely, but you feel that it now deserves more serious consideration.

Dr. POLLIN. Yes.

Senator HUMPHREY. Let me talk with you about some of the specific effects, the nine health effects that you have listed among users of marihuana. You state that seven result in anatomical changes. Which seven are those?

Dr. POLLIN. I was referring there not to specific effects, Mr. Chairman, but trying to group the many studies which have been done into various areas. I believe that in the areas of intellectual impairment and change, driving and skills performance, cardiovascular effects, pulmonary effects, the immune response, psychopathology and behavioral changes, and reproductive and endocrine effects—in those seven areas, changes have clearly been demonstrated either in animal studies and/or in human studies.

Senator HUMPHREY. Physiological changes?

Dr. POLLIN. Physiologic or behavioral changes.

With regard to changes in the CNS and specific brain damage and with regard to cellular changes, there it seems to me that the evidence is so contradictory that one cannot speak with certainty of any changes occurring, let alone evaluating what the significance for human well-being and performance might be.

Senator HUMPHREY. What about the reversibility of physical changes and anatomical changes? Are all of these reversed in time, or are some permanent or cumulative? What is the situation there?

Dr. POLLIN. That is an area where a great deal of additional study is required. At this point, I do not know that we can speak with certainty as to any irreversible changes that have been clearly documented, though there are certainly a variety of animal studies, individual studies, which find these in certain kinds of experimental designs. But there is not a sufficient bulk of studies and replications of those studies so that we can speak with certainty to that point.

Senator HUMPHREY. But these changes remain so long as marihuana is used?

Dr. POLLIN. Yes.

Senator HUMPHREY. You mentioned a possible higher risk of lung cancer from smoking marihuana. Can you give us more information on that? Is it correct that there is a higher concentration of tars and carcinogens in marihuana smoke?

Dr. POLLIN. Yes. We know that the average preparation of marihuana produces some 50 percent more tar than the same weight of standard tobacco cigarettes.

Senator HUMPHREY. What is the implication of that? Does that mean that the risk of cancer is 50 percent higher? How does that correlate?

Dr. POLLIN. I do not know that one can make a 1-to-1 relationship, but given the fact that most investigators relate the carcinogenic effect of tobacco to the tar portion, and given the fact that specific carcinogens such as benzopyrene are 70 percent higher in marihuana tar than in the same weight of tobacco tar, the carcinogenic potential of marihuana, certainly, I think at this point, would seem to be at least as great as that of tobacco, if not greater.

Now, the other major set of factors that are involved have to do with the level of exposure to these carcinogens and over what period of time.

Senator HUMPHREY. Yes.

Dr. POLLIN. Though it is certainly true that the great bulk of marihuana users do not smoke 20 to 30 joints a day, and many tobacco smokers smoke one to two packs, nonetheless there are sufficient differences in the pattern of smoking. Many marihuana users will try to inhale as deeply as possible, keep the smoke in as long as possible, and smoke down to the very, very tip. This is a pattern of smoking which one would design if one were trying to maximize exposure to carcinogens.

Senator HUMPHREY. And I suppose they use unfiltered cigarettes as well; that is a safe assumption. So, the concentration of these agents is about as great as it can possibly be.

Let me ask you about the effects on the reproductive system. This is one that is bound to interest young people. Will you go into that more fully at this time?

Dr. POLLIN. Yes. We are talking here about direct effects upon those body structures and systems which are directly involved in reproduction; for example, the structure and function of sperm in the male, where in both human and animal studies, the bulk of studies report that after any period of sustained marihuana use, the number of normal sperm is decreased and the number of abnormal sperm is increased. The functional capacity of sperm is significantly decreased.

We also are considering here effects upon the set of hormones and endocrine systems which influence the reproductive system among many other important body functions—pituitary hormones which have multiple impacts upon body processes. Again, in this area the bulk of studies show that significant levels of marihuana use do interfere with the normal function of these systems and do tend to decrease circulating levels of significant hormones.

This is an area where the bulk of studies thus far indicate that the changes are reversible after some period of time, but where we cannot speak with definitive certainty as to whether this is always true or whether there is some threshold level where the changes may become irreversible.

Senator HUMPHREY. Are there any study results that indicate an effect on normal growth and development? You mentioned the effect on endocrine levels.

Dr. POLLIN. I am not aware of any studies which have yielded clear findings in that area. It is an issue which has been of concern to various clinicians.

Senator HUMPHREY. Yes.

Dr. POLLIN. But I do not know of definite study results.

Senator HUMPHREY. Well, you have mentioned the change in sperm cells, the increase in abnormal cells, and the decrease of normal cells. What about the effects on the female reproductive system?

Dr. POLLIN. There, both in animal studies, where the bulk of the work has been done, and in a number of human studies, it has been found that there are significantly increased numbers of abnormal menstrual cycles with failures to ovulate in the female. There are lowered levels of prolactin, which is one of the key hormones which is important in regulating the reproductive system.

There is a significant death of embryos and their reabsorption in animal studies of primates. Again, these are just a few characteristic studies in an area of work where there have been many reports of similar results.

Senator HUMPHREY. How would you characterize the body of research now on the health effects of marihuana today as compared with even 5 years ago or 10 years ago? Is it substantial today or is it still fairly preliminary? What is your professional view?

Dr. POLLIN. I think it depends on what yardstick one applies. Compared to what we knew 10 years ago, there has been tremendous progress. Compared to what we know about other analogous, major public health concerns, we are still at a very, very early age.

One way, I think, to put this in perspective is to recognize that we have known about what was the active component in whisky; we have known about alcohol, its chemical structure and the role it played for hundreds of years. We have known what was the active component in tobacco for well over 60 or 70 years.

We only learned what was the active component among the over 400 different compounds which are included in marihuana; we only learned which of those was the active component about 10 or 11 years ago. Until then, it was really very difficult to do any kind of systematic study with marihuana.

So, of necessity, this field is behind where we were in understanding the health effects of tobacco 25 years ago.

Senator HUMPHREY. The three future goals you have stated are to continue to support research, continue to develop and implement effective means of warning people, and continue to encourage the private sector, and the parents groups, in particular, to work toward discouraging marihuana use by young people.

Can you talk about some of the things underway and what you hope to do in the future in these three regards?

Dr. POLLIN. I want to repeat again that what we will be able to do in this area will be very much influenced by resource constraints, the extent of which at this point are not totally clear.

Senator HUMPHREY. You are talking about the budget, very diplomatically.

Dr. POLLIN. Nonetheless, I am convinced that we will have significant resources available to us, though they will be reduced.

Senator HUMPHREY. Yes.

Dr. POLLIN. And I am convinced that there will be a great deal that we can do and will do.

In the area of research, we are clearly going to have to make some difficult choices, but I think we are in a much better position to make those choices in the sense of prioritizing research areas because we do know a good deal more now than we did 10 years ago.

So, we will continue to emphasize that, above all else, there is nothing worse than bad research, because that misleads you and leads you into bad policy and wasteful future scientific efforts.

Senator HUMPHREY. Yes.

Dr. POLLIN. But within the general principle that we will attempt to identify and only support research of highest quality and excellence, we do intend to be more targeted and more selective in the areas in which we try to encourage new studies along the lines of those that I have laid out here.

With regard to warning young people, their families and the Nation, we do think that there has been a sufficient increase in the critical mass of knowledge available so that we can now speak with confidence about the fact that this is not a benign drug in a way that we could not 5 years ago.

Senator HUMPHREY. Yes.

Dr. POLLIN. And we intend to get that message out in a variety of ways.

Senator HUMPHREY. What means does NIDA have today to do that?

Dr. POLLIN. Well, you have provided us with one important way to do that this morning. But, in addition, we have a variety of research monographs, services monographs, and publications. Again, we are going to have to cut back in that area but, we feel better able to target and select.

Also, because of the progress that has been made in the past 5 years, we are much more comfortable in identifying which set of findings we think warrant special national attention. For example, when the high school senior survey results for 1981 do become available at the end of November, because our confidence in the reliability and accuracy of that data is very high, and we will try to see to it that these results receive widespread national attention.

In some of these other areas, we have increasingly begun to convene groups of relevant individuals. We recently sponsored a meeting where we called in clinicians from all over the country, having the feeling that the clinicians who have not done systematic research, but nonetheless have considerable experience in working with disturbed adolescents, have a very important message to give us and to give the country about what they have been seeing—a message which has not come through some of the structured findings.

The proceedings of that meeting are now in the final stage of being edited. We think we can, in a variety of ways, call national attention to the clinical consensus that marihuana does have profound clinical consequences.

Senator HUMPHREY. Well, I commend you on all of those goals, and particularly your work in support of parents groups because, as you pointed out, resources are limited here at the Federal level, or at least you alluded to it, and it is certainly true.

I think that in these parent groups, you and I and others who are trying to spread information have very great allies with, to be sure, modest financial resources, but great spiritual resources. They are very energetic and dedicated to what they are doing, and I certainly encourage you in that regard.

I have two questions that Senator Denton would like me to ask of you. Why the percentage of funding for marihuana research declined over the past few years?

Dr. POLLIN. Why has the percentage——

Senator HUMPHREY. Why has the percentage of funding for marihuana research declined?

Dr. POLLIN. The decline is a somewhat small one. It is a decline primarily of percentage, not of absolute dollars. If we collect and summarize the priorities and the policy directives that we have received from a variety of sources, including the Congress, the number of areas that we have been asked to give priority attention to in research have climbed very dramatically during the past 5 years.

Paying attention to the drug abuse problems in special populations, such as in the elderly and women, was one mandate we were given. Second, as drug use patterns in the country have changed dramatically, the number of substances which are of considerable public health concern has increased dramatically.

PCP was a drug that was known only to veterinarians 10 years ago. It became a source of great concern only during this decade, and there was a very legitimate need to mount a new program looking into that drug.

So, the number of areas that require attention has grown, and the level of funding has not grown proportionately.

Senator HUMPHREY. How does marihuana research fare in relation to other drug research at the institute?

Dr. POLLIN. It is the second largest area of research, if we categorize our research in terms of the major drug or drug class being attended to. The drug class which receives the largest percentage of funds is the narcotics, such as heroin, and marihuana comes second, among some 15 or 20 different categories of drugs which we have a responsibility for studying.

Senator **Humphrey**. Dr. Pollin, thank you very much for your excellent testimony and for your very excellent work and that of your associates.

Dr. **Pollin**. Thank you.

Senator **Humphrey**. Dr. Durell, Dr. Snyder, thank you very much.

Dr. **Pollin**. Thank you very much.

[The following material was subsequently supplied for the record:]

RESPONSES TO QUESTIONS SUBSEQUENTLY SUBMITTED TO DR. POLLIN

1. Your testimony indicates that youthful marijuana use has not been well represented to this point in the research. Could you elaborate on the research efforts the Institute is planning to address this?

Because of the human subjects problems that would be posed by giving marijuana to human volunteers who are not adults, there is no experimental research on the biological effects of marijuana on youth. Our knowledge in this area is gleaned from animal studies ("Hypothermic and Hypotensive Responses to Marijuana," "Cannabinoid Effects on Female Hormonal Balance"), to foreign studies, and from epidemiological studies in which questions are asked about drug effects from youth who report using marijuana ("Sociological and Psychological Study of the Significance of Chronic Marijuana Use in Adolescents," "Consequences of Arrest for Marijuana Possession," etc.). In the biological area, and to a lesser degree in the psychological area, such studies are limited by the necessity of reliance on self-report of drug use.

We are currently considering longitudinal studies of drug abuse among adolescents, which would shed light on the biological and psychological consequences of marijuana use by youth. We also plan to do a large-scale case study of youth referred by their physicians as suffering from psychological problems associated with marijuana use. This study will seek to identify possible biological and behavioral factors associated with or resulting from heavy use. Another planned study involves the application of multiple standard tests to previously studied adolescents and young adults who were heavily involved with marijuana.

2. What methods are researchers using to assess the damage of marijuana on adolescents in light of the important restraints on actual testing of adolescents themselves?

There are three broad categories of methods currently employed to assess the damage of marijuana on adolescents: (1) Self-report questionnaires and interview schedules; (2) Non-invasive experimental measurement of physiological/biomedical functions on limited numbers of voluntary human subjects who declare themselves habitual users of marijuana and invasive and non-invasive measurements in selected laboratory animals; (3) indirect statistical control and comparison measures of macro-level indicators. Adolescents are capable of providing informed consent for the completion of questionnaires where their behaviors can be described, their actions anonymously quantified, and the data correlated with their report of drug use. Performance measures (eg: school and employment) are the easiest to assess in determining the adverse impact of drugs on the body's physiology and psychology. Criminal behavior, family, and social problems also provide a means of assessing psychological well-being.

3. In the Eighth Annual Report to Congress on Marijuana and Health you indicated that the marijuana plant material is quite complex, containing at least 421 compounds. Are the effects of all these compounds being studied or simply of delta-9-THC?

Most published research has been carried out on delta-9-THC because it is the primary psychoactive component in marijuana. It is one of over 60 related chemicals called cannabinoids which are found among the 420-plus chemicals in marijuana. Cannabinoids other than delta-9-THC have been studied and may have pharmacological interactions with THC itself but are much less psychoactive individually.

In the last three years an increasing amount of study has been carried out on "marijuana" itself in an effort to provide more information on the non-THC effects due to other components in the plant and their interactions. These studies are complicated by the fact that specific doses of specific components are hard to estimate when dealing with a complex mixture.

4. How can the research be designed to adequately evaluate the substance youth are actually smoking?

Chemical analysis methods are quite capable of detailing the chemical make-up of material being used on the street. Standard methods have been used in fact for the past several years to analyze the major cannabinoid components of illicit marijuana seizures by the Drug Enforcement Administration through an interagency "potency monitoring" program. It is this program that has established the fact that marijuana on the street has increased from a potency to 0.5% prior to 1975 to a potency of over 4% today.

5. What mechanisms are in place for reviewing literature distributed by NIDA to ensure it has the most up-to-date information?

Over the past two years, NIDA has updated and revised several of its major public information materials. A number of these revisions have taken almost a year to complete and have involved extensive reviews by both scientific and policy reviewers both within and outside of the Institute. In order to systematize this review process, the Institute has initiated a structured and comprehensive review of all of our public information publications, as described in the following sections.

A. OFFICE OF COMMUNICATIONS AND PUBLIC AFFAIRS (OCPA) REVIEW OF PUBLIC INFORMATION MATERIALS

1. OCPA staff review NIDA publications noting any problems with outdated information, misleading drug abuse prevention messages, and outside of Government sources of drug information.

2. The Director, OCPA, and the Chief of the NIDA Clearinghouse review each report and all identified problems and develop OCPA's recommendations about decisions to reprint, revise, or discontinue the publication. These decisions are based on the cost of reprinting, the amount of revisions needed, and the relative importance of the publication as part of the NIDA public information program.

B. NIDA POLICY REVIEW

Members of the Office of the Director staff serve as policy reviewers on all the updated materials. They review OCPA's recommendations and approve those that make the most sense in light of budgetary constraints and NIDA's future role.

C. COMMENTS FROM OUTSIDE REVIEWERS

NIDA's report then is sent to outside groups, such as the National Federation of Parents, the State Prevention Coordinators, some of NIDA's Advisory Council members, etc., for their input and reactions.

D. DIRECTOR'S REVIEW AND APPROVAL

The Director, NIDA, reviews reports of NIDA staff recommendations and outside comment on reprinting, revising, or discontinuing each publication.

E. When the Director has made decisions about reprinting, revising, and discontinuing publications, a final report summarizing these decisions is disseminated to other Federal agencies, States, outside organizations, and others interested in NIDA's printing and publications program.

6. What plans does the Institute have for prevention activities?

During the past several years, two major activities of the Federal government in marijuana prevention have been in the areas of knowledge development and technical assistance, with an increasing reliance on States and local communities to take the lead in service delivery at the local level. Accordingly, NIDA's major program objectives in this area have been to develop, demonstrate, evaluate, and disseminate effective prevention strategies and to strengthen State and local capacities for managing prevention programs.

With the advent of the new Alcohol, Drug Abuse, and Mental Health Services (ADM) Block Grant, the implementation of drug abuse prevention programs is now fully considered a State and local responsibility. The importance of this particular responsibility has been given emphasis by the requirement that States use at least 20 percent of the funds available for alcohol and drug abuse services for prevention or early intervention programs.

Although the Institute will no longer provide direct financial assistance to marijuana prevention programs, it will continue to carry on a number of important activities to help these programs operate effectively. Research will continue on trends in marijuana use, on the hazards associated with chronic use of the drug, and on the characteristics of marijuana users; the results of such research will be widely disseminated. The Institute plans to sponsor additional parent workshops, in order to bring State-level prevention workers, educators, treatment specialists, and parents together as a team for carrying out State prevention activities. When requested, NIDA also will provide technical assistance, including written materials, not only to States and localities, but to the private sector, parents groups, and others doing work in marijuana prevention.

7. What is your program for disseminating information grained from research?

The National Institute on Drug Abuse places high priority on the communication of information gained from research. NIDA disseminates information to the scientific and clinical community through the following publications and activities:

Research Monograph Series - This series of publications is designed to give rapid, targeted dissemination of drug abuse research findings, integrative reviews on key problem areas, and new research techniques to the scientific and professional community. Topics cover the full range of biomedical, clinical, and psychosocial drug abuse research. The latest monographs cover such topics as "New Approaches to the Treatment of Chronic Pain," "Demographic Trends and Drug Abuse, 1980-1995," and "Marijuana Research Findings, 1980."

Research Issues Series - This series, which includes abstracts of research studies, bibliographies, and essays on current issues of interest to the drug research community, focuses on psychological and sociological research and progress, definitions, and methodology in the field.

Treatment Research Reports, Monographs, and Manuals - These publications provide information to the drug abuse treatment community on the service delivery and policy-oriented findings from NIDA-sponsored studies. Publications include state of the art studies, innovative service delivery models for different client populations, innovative treatment management and financing techniques, and treatment outcome studies.

Special Reports - NIDA disseminates technical papers and special reports that cover a range of topics of interest to the drug abuse community.

Research Analysis and Utilization System (RAUS) - This system facilitates expert evaluation and dissemination of the latest research findings in a selected research area. The latest topics reviewed were "Benzodiazepines: Abuse Liability" and "Drug Abuse of the American Adolescent." Both reviews resulted in state-of-the-art monographs and other planned documents.

Technical Reviews - These are meetings of technical experts to advise on advances in a particular drug abuse research area. For example, NIDA and the Department of Defense plan to hold a technical review on the effects of drugs and performance. The focus of the technical review is to plan future coordinated research strategies.

Knowledge Utilization Committee - Members from each of NIDA's various Division and Offices cooperate to assure that applicable theoretical research reaches practical application in the clinic.

Staff Professional Activities - The NIDA research staff disseminate research findings through their participation in professional associations and societies, and through the presentation of scientific papers, lectures, and seminars at professional meetings. In 1981, the staff of the Division of Research presented more than 23 scientific papers and lectures at such meetings.

In addition to these efforts to disseminate scientific research findings to the professional community, NIDA realizes the need to translate research findings into public information materials to be distributed to the general public.

Through the Office of Communications and Public Affairs, NIDA plans, coordinates, and implements its communications, publications, and information handling functions. The National Clearinghouse for Drug Abuse Information and the NIDA Resource Center process approximately 137,000 inquiries per year for drug abuse information.

In addition, OCPA implements a broad-based publications program targeted at the important segments of NIDA's constituency and the public including researchers, preventors, trainers, the treatment community, the medical community, and industry.

The Institute's scientific and technical staff participate in responding to inquiries from the media, and in developing written materials on topics of interest to the press.

8. What correlation, if any, is there between adolescent marijuana use and criminal activity?

While a great deal of research has been done on the relationship between crime and drugs, there are relatively few studies which have attempted to understand the correlation between criminal activity and adolescent drug use per se, and even fewer which have focused specifically on the correlation between marijuana use and crime. A recent paper prepared for the National Institute on Drug Abuse, entitled "The Delinquency and Drug Use Relationship Among Adolescents," by Richard Clayton is an attempt to critically review the most important research findings in this area.

As a starting point, Clayton finds general agreement that a statistical association exists between marijuana use and criminal behavior. For example, at least one researcher concluded that "marijuana use, far from being an isolated behavior, is generally part of a larger behavioral pattern involving the use of other drugs and engaging in a variety of other unconventional or nonconforming actions such as delinquency, sexual experience, political activism, and attenuated academic performance." Jessor: 1979.

In his review, Clayton also found consensus among research studies that while delinquency and drug use are related, delinquency precedes use of illicit drugs, including marijuana.

The question which Clayton, and other researchers, find most difficult to answer is whether the observed correlation between delinquency and drug use among adolescents remains valid when the variables antecedent to and causally related to both delinquency and drug use are statistically controlled. Many of the studies Clayton reviews support the view that marijuana use by itself is not related in any meaningful way to criminal behavior and that delinquency leads to drug use rather than vice versa. However, a 1979 study by Krohn and Massey of a representative sample of over 3,000 adolescents, aged 12 to 17 years, provides strong evidence that the delinquency-drug use relationship is not spurious. As stated in my testimony, there is a correlation between chronic marijuana use and crime among adults. Further research is needed to determine the extent of such a correlation among heavy adolescent users.

Senator HUMPHREY. Our next panel is the second of three; it is comprised of researchers and clinicians, and they are Dr. Sidney Cohen, professor in the Department of Psychiatry, UCLA School of Medicine; Dr. Carol Grace Smith, associate professor, Uniformed Services University of the Health Sciences; Dr. Donald MacDonald, a pediatrician from Clearwater, Fla.; and Dr. Ingrid Lantner, a pediatrician from Willoughby, Ohio.

Good morning. Thank you for coming, and for your patience. Let us proceed from your right to left? I would ask that you summarize your remarks; your prepared statements will be included in full in the record, of course.

Dr. Cohen?

STATEMENT OF SIDNEY COHEN, M.D., CLINICAL PROFESSOR OF PSYCHIATRY, NEUROPSYCHIATRIC INSTITUTE, UNIVERSITY OF CALIFORNIA AT LOS ANGELES; CAROL GRACE SMITH, PH. D., ASSOCIATE PROFESSOR, DEPARTMENT OF PHARMACOLOGY, SCHOOL OF MEDICINE, UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES; DONALD IAN MACDONALD, M.D., PEDIATRICIAN, CLEARWATER PEDIATRIC ASSOCIATION, CLEARWATER, FLA.; AND INGRID L. LANTNER, M.D., PEDIATRICIAN, ERIESIDE CLINIC, INC., WILLOUGHBY, OHIO, A PANEL

Dr. COHEN. Thank you, Senator Humphrey. It is a pleasure to be back and to try to bring you and your colleagues up to date on progress in the area of cannabis since we last met, and to attempt to make some sense out of the problem.

I want to point out, first of all, that adolescents are not just young adults; they are different in many areas. They do not, as a rule, have the emotional resiliency and the impulse control of older people. It is likely that mental functioning is more impaired by drugs when the organization of the brain is less developed than when it is matured.

Young people tend to be more suggestible and less concerned about the future consequences of their acts. They are more influenced by peer persuasion, and they may overindulge in activities that can be detrimental to them not only now but for long years to come.

Furthermore, developing a pot-smoking habit at an early age and continuing it provides just additional time for the chronic effects of the drug to become manifest.

Now, the other people on this panel are going to present information about the mental changes that accompany the consistent use of marihuana, especially in adolescents. They include not only the intoxicated state, but the burnout, the motivated condition.

I am not going to address that point, because they will do it adequately. I just want to associate myself with those remarks because I, too, have seen young, daily users who have really lost, either completely or incompletely, their drive, ambition, and motivation, and revert to a very sad condition.

Instead, I want to speak to two of the issues that Dr. Pollin mentioned that I consider almost as important, and the first is the morbidity and mortality that is associated when young people intoxicated on marihuana get into a car and drive. These are usually people trying to learn two skills at the same time—the skills of learning to drive safely and the skills of learning how to cope with the mental changes that are involved with the marihuana experience, and this is not easy.

So, the question is how serious are the hazards of pot smoking and driving? Although the data are, as usual, far from complete, we know a few things. First, we know that people who smoke pot do drive, and this has been confirmed in a couple of studies in which 75 percent or so of the youngsters have told us that they are stoned and will drive, and think they drive pretty well. Some say they will drive better than usual. But when tested, unfortunately, this is not true.

Some of them will tell us that they not only smoke pot and drive, but that they also drink and smoke and drive. We know that the combination of alcohol and cannabis impairs the driving skills even more than cannabis alone. So, this is not good.

Roadside tests have been done for THC, the active ingredient, and as many as 16 percent of all drivers who were picked up for unsafe practices in California have been found to contain THC in their blood. When you eliminated those who also contained alcohol in their bloodstream, the percentage rose to 24 percent.

Now, when medical examiners look at corpses who have died in connection with auto accidents, they find that about 10 percent of their clients have THC in their bloodstream, with or without alcohol.

So, I am afraid that THC and cannabis are contributing to our enormous driver accident and fatality problem, and I am afraid this is not going to go away. Instead, I suspect that it is going to increase. Why should this be?

The driving impairments caused by marihuana are multiple. Immediate memory goes; perception is impaired; visual signal detection and peripheral vision are lost or in abeyance. There is attentional failure—the failure to attend to a significant event out in the environment, which can be understood as a loss of vigilance.

Complex reaction time is increased, and then some of my marihuana-smoking friends tell me that they have visual illusions; the street rolls up and down as they drive along. This can be very pleasant, but it can also be very dangerous.

Now, the deficiencies with alcohol are a little different, and both of these drugs worsen driving skills. As I said, the combination is more detrimental than either one alone.

There is a suspicion that the impairment due to cannabis lasts longer than the high—up to 4 hours. If this is true and if this is confirmed by further testing, this will be a very unfortunate condition because people will feel they are normal, get into the car, and still be impaired.

Now, if driving on a two-dimensional surface is impaired, think of what driving in three-dimensional space is like. There have been a few studies in this regard of flying and marihuana smoking, and the results are not happy ones. Experienced pilots who also had previous experience with marihuana were given a single joint to smoke, and they could not perform a simple landing pattern satisfactorily. They would have crashed if this had been done in real life rather than in a Link trainer. So, let us never fly willingly with someone who is under the influence.

The second condition I would like to mention is the effects of long-term cannabis smoking on lung function. Acute bronchitis is well known and does not need any elaboration from me. What I wonder about is whether chronic lung disease—emphysema and fibrosis—can occur when marihuana is smoked over the years.

The constituents in marihuana and tobacco are quite similar, except that there are cannabinoids in the former and nicotine in the latter. Otherwise, they are fairly identical, although as you have heard, there are more coal tars in marihuana smoke than in tobacco smoke.

But the way that marihuana is smoked makes one really suspect that chronic lung disease, over decades, will result, and we have some animal evidence to bear this out. It is true that coal tars are present to a greater degree in cannabis than in tobacco, and even present to a greater degree in cannabis than in old-fashioned tobacco—much greater than in the latter-day low-tar cigarettes that are commonly used at this time.

Now, does marihuana smoke cause lung cancer in man? We do not know; it takes a decade or two to build a lung cancer, and we just do not have that experience in this country. And in the other countries where marihuana has been traditionally smoked, the health records are not good enough to be of use to us.

I would like to cite one study that is pertinent. A number of investigations on American soldiers in West Germany have been very revealing. They smoked hashish because it was available and inexpensive there for a number of months, and developed bronchitis, for which they were hospitalized. They permitted the doctors to take a snip of tissue from their bronchial tubes. To the astonishment of everyone, when these were looked at under the microscope, they found atypical cells, proliferation of the basal cells, conversion of the basal cells to squamous cells. What does this mean? These are precancerous lesions, according to our lung specialists.

This same thing happens with tobacco, but over many years, and here they were only smoking for months. So, I think this is a significant item of information, and I must say that smoking both tobacco and cannabis would be more damaging than either alone, but smoking cannabis alone, I would predict, can cause carcinogenicity over time and chronic obstructive lung disease over time.

The message I bring to you is not an encouraging one, unless we can reverse the pattern of youthful cannabis smoking. What has come forth from the research of the last dozen years, most of it supported by the National Institute on Drug Abuse, has been disquieting. I have only touched on one or two areas, but other speakers that you have on the panel will speak to other aspects.

Thank you, Mr. Chairman.

Senator HUMPHREY. Thank you, Dr. Cohen.

[The prepared statement of Dr. Cohen follows:]

STATEMENT
BY
SIDNEY COHEN, M.D.

Clinical Professor of Psychiatry
Neuropsychiatric Institute, U.C.L.A.

Before the
SUBCOMMITTEE ON ALCOHOLISM AND DRUG ABUSE
OF THE
COMMITTEE ON LABOR AND HUMAN RESOURSES
UNITED STATES SENATE
GORDON J. HUMPHREY, CHAIRMAN
October 21, 1981
ON
HEALTH EFFECTS OF MARIJUANA ON YOUTH

Adolescents are not simply young adults. They are different in their response to mind-altering drugs like marijuana. They may not have acquired the emotional resilliency and impulse control to deal with the impact of marijuana. It is likely that mental functioning is more affected by drugs when the organization of the brain is less developed than when it has matured. Youngsters tend to be more suggestible and less concerned about future consequences than oldsters. They are more influenced by peer persuasion to indulge and overindulge in activities that might be detrimental. Furthermore, developing a pot smoking habit at an early age and continuing it provides additional time for the chronic effect of the drug to become manifest.

Others on this panel will present information about the mental changes that accompany the consistent use of marijuana in adolescents. They include, not only the acute intoxicated state, but also the "burn out" or amotivated condition. I have seen preadolescents and adolescents in various stages of amotivational syndrome during chronic marijuana use (daily use for months to a year or so) that I feel that it not only exists but is not too uncommon in heavy, young consumers of cannabis. It seems to be much less frequent in older adults. Instead of discussing this further, I'd like to present two other problems that can arise in connection with the protracted use of cannabis.

The first is the morbidity and mortality that occurs when young people intoxicated on marijuana drive a car. These individuals are trying to acquire two skills at the same time: developing the refexes of learning to drive safely, and learning how to cope with the mental changes that marijuana induces. This is not easy.

The question is: how serious are the hazards of smoking pot and driving? The data are far from complete but we know a few things.

1. Driving after marijuana use has been reported by 60 to 80 percent of users. In one study 64 percent reported that they drove after smoking pot and drinking alcohol, and 20 percent mentioned drinking and smoking while driving. The combined use of beverage alcohol and cannabis can only add to the difficulties a driver will have in operating a car.

2. Up to recently a roadside test for THC the active component in marijuana, was not at hand. At present rapid blood and breath tests with fairly good reliability are available. We have evidence from a California investigation that of 1,800 blood samples from those arrested for driving in an unsafe manner, 16 percent were positive for THC. When drivers who also had alcohol in their blood was excluded, the THC detection rate rose to 24 percent. When medical examiners test the blood of drivers killed during auto accidents they find about 10 percent have THC in their blood stream. A number of these casualties also have varying alcohol levels. It is not possible from our current fund of information to estimate how much cannabis adds to the car accident fatality rate.

THC remains in the body for days even after a single exposure so that the presence of THC in the blood does not automatically mean intoxication.

3. The driving impairment caused by marijuana has been determined from both driving simulator and actual in-traffic driving studies. We know that immediate memory, remembering what one just did, can suffer under marijuana. Perceptionis also impaired, especially visual signal detection and peripheral vision. Attentional failure also occurs, this can be understood as a loss of vigilance. Complex reaction time is increased. The illusion that stationary objects are moving is occasionally mentioned by the person who smokes marijuana.

As with alcohol the deficiencies noted are dose related, the more one smokes, the greater the impairment. These changes are different than those seen with alcohol. Both worsen driving skills, and the combination is much more detrimental than either alone.

There is a suspicision from two studies that these changes may persist up to four hours. This means that one may drive less well for hours after coming down from the "stoned" state. It will be necessary to confirm these studies before we can make such a statement with a good level of confidence.

4. I should mention that if driving on a two dimensional surface is worsened by marijuana, driving in three dimensional space is greatly impaired from ordinary amounts of the drugs. Pilots experienced in both flying and with the marijuana state have a

severe deterioration of ability to fly a simple landing pattern when tested after smoking a single marijuana cigarette. Fortunately, this work was done in a Link trainer, not in a real life situation.

The second condition I would like the mention relates to the effects of long term cannabis smoking on lung function. Acute bronchitis (smoker's cough) is well known in heavy users, and needs no particular mention here. What we do not know is whether chronic lung disease, emphysema and fibrosis, can result from marijuana smoked over the years. The constituents in marijuana and in tobacco are similar, except for the cannabinoids in the former and the nicotine in the latter. Irritants are found in marijuana smoke and the way this drug is inhaled makes it quite likely that chronic irritation will occur, leading to chronic obstructive lung disease. The condition has been produced in test animals exposed to the smoke.

Actually, cannabis contains more coal tars than present day tobacco. It contains more carcinogens than old fashioned tobacco cigarettes. Benzpyrene, benzanthracene and other carcinogens are contained in marijuana smoke. Marijuana smoke condensate produces skin tumors in mice painted with this material.

Have lung cancers in marijuana smoking humans been found? Not yet, but it takes 20 years or so to build a cancer and we do not have many people who have been smoking heavily for that length of time. However, a series of studies of American soldiers stationed in West Germany have been revealing. They were heavy hashish smokers for a number of months and developed bronchitis for which they were hospitalized. Most, but not all of them were also users of tobacco. When a snip of tissue from their bronchial tubes was examined under a microscope, atypical cells, proliferation of the basal cells and conversion of the basal cells to squamous cells were identified. These changes are considered to be precancerous lesions by lung specialists. They occur in heavy tobacco smokers only after many years of smoking. In less than a year of heavy hashish use they were found in this group of over 30 soliders. It would be anticipated that the combined use of tobacco and cannabis will produce more chronic lung disease and malignancies than either substance used alone. The combined use of the two substances is common. Therefore, we may look forward to further increases in chronic pulmonary diseases as our youth continue to smoke over the years.

The research, in good part funded by the National Institute on Drug Abuse during the past dozen years has brought forth a number of disquieting findings about cannabis. The speakers today have mentioned only those in which the evidence is fairly strong. Questions about cannabis' effect on sexual functioning, hormones, immunity, cell development and so forth remain preliminary or inconclusive and are not presented for your consideration at this time.

Senator **Humphrey**. Dr. **Smith**?

Dr. **Smith**. Senator Humphrey, I would also like to thank you for the invitation to appear before you. My topic will be more related to the effects of marihuana on the reproductive system.

Marihuana is most widely used by adolescents and young adults during their reproductive years. Clinical observations and early laboratory studies indicated the possibility of disruption of the reproductive system caused by chronic, intensive marihuana use, but few definitive studies have been done.

It was difficult to quantify the actual amount of drug use by young people and then to make positive correlations between drug use and changes in reproductive parameters. As is still the case, legal and ethical considerations have prohibited the administration of marihuana to adolescent boys and girls or to young women who might become pregnant.

It is now apparent that carefully controlled studies which actually measure blood levels of the drugs are necessary to clarify some of these problems. Such things as daily and cyclic changes in hormone levels also have got to be considered, and it is of critical importance to determine the effects of the drugs on the reproductive hormones, and then to determine if these changes in hormone levels are actually sufficient to affect fertility.

The reproductive system is actually unusual among bodily systems in the complexity of the mechanisms that control it and which must operate properly in order for it to function. One of our best experimental animal models for studying the human reproductive system is the rhesus monkey. The female has a roughly 28-day menstrual cycle that is controlled by the same gonadotrophic hormones—LH and FSH and the sex steroids, estrogen, and progesterone—as the human menstrual cycle.

These monkeys can be administered specific amounts of marihuana or other drugs and the reproductive parameters can be examined, then, directly. A number of studies which have contributed to our understanding of the effect of marihuana on the reproductive system have been done in rhesus monkeys. Other studies have been done in nonprimate animals and a few studies have actually examined the effects on the human reproductive system of chronic marihuana use.

The currently available information from both animal and human studies shows that frequent, intensive marihuana use is definitely associated with risks to the reproductive system. And while there are still many unanswered questions, a few general statements can be made, and I would like to make three statements.

First of all, the THC in marihuana can inhibit the hormones that control sexual development, fertility, and sexual functioning. These effects can be observed in both males and females. The disruptive effects appear to be mediated primarily through an inhibition of the pituitary hormones, although direct effects on the ovaries or testicles or other reproductive tissues may occur with chronic use of the drug. Thus, marihuana or THC administration can produce infertility in both male and female animals, but the effect appears to be reversible in sexually mature animals.

Second, although marihuana may not have direct toxic effects on the developing embryo or fetus, effects on placental function may inhibit the completion of a successful pregnancy. In rhesus monkeys, THC treatment has been shown to be associated with an increased reproductive loss primarily in the latter part of pregnancy. This is seen as fetal deaths, stillbirths, and neonatal deaths.

In addition, the birth weights of infants born to THC-treated mothers were significantly less than in control groups. So, the current evidence indicates an effect, and this effect appears to be related to a drug interference with placental function as the mechanism.

Third, during adolescence and puberty, the neuroendocrine mechanisms that will be necessary for normal fertility are being developed and may be more vulnerable to the effects of marihuana.

Puberty is a process of complex physiologic changes, resulting eventually in reproductive maturation. We use the term "adolescence" to generally describe the period of development that precedes full reproductive competence or puberty. Our understanding of the processes that control adolescence and puberty, although incomplete, have advanced significantly in recent years.

The prevailing hypothesis to explain the initiation of puberty postulates that there is a highly sensitive negative feedback mechanism for the action of sex hormones in the hypothalamic portion of the brain that holds gonadotropin secretion in check until puberty. The exact mechanism that initiates the onset of puberty in primates is still unknown.

The early events, however, are very dependent upon the development of an episodic or a pulsatile release of LHRH, a hormone from the hypothalamic portion of the brain. This LHRH then causes a secretion of gonadotropins LH and FSH. Thus, apparently, the limiting factor to pubertal development in primates is not the gonad or the pituitary gland, but rather this hypothalamic portion of the brain and the secretion of the hormone LHRH.

So, it is the role of hypothalamic LHRH in the onset of this normal pubertal development that is an important consideration when we postulate an effect of a drug such as THC on pubertal development.

Preliminary studies in both male and female rhesus monkeys show that THC inhibits gonadotropin secretion by an inhibition of the secretion of LHRH. Of further concern are the observed effects of the short-term administration of THC to these animals on their menstrual cycles. In our studies of rhesus monkeys, we have shown that 14 days of treatment with THC produces disruptions in menstrual cycles that can last as long as 4 or 5 months.

These cycles are marked by an absence of ovulation and an absence of the normal cyclic patterns of the hormones. The normal early menstrual cycles in adolescent girls demonstrate similar irregular patterns, as the mechanisms that will establish the normal cycles are being developed. Thus, drug-induced disruption in these early cycles could cause major problems during pubertal development. If the inhibitory influence of the drug persisted for sufficient periods of time, permanent infertility might be the outcome.

In conclusion, it now appears evident that marihuana or THC can produce disruptive effects on the reproductive system. The studies during the last several years have provided a number of important answers to questions about the reproductive consequences of marihuana use. Several important issues, however, remain.

A point of major concern should be a clear definition of the extent of drug use that is necessary to produce the disruption in reproductive function, and to what extent tolerance to these inhibitory effects occurs. Other important issues include the effects of marihuana on the developing or adolescent reproductive system and the combined effects of marihuana and contraceptive drugs on the reproductive system.

I think it is very important that we remember that the disruption of the reproductive system is, in fact, a very subtle process which may be detected only when fertility is desired. For this reason, drug effects on the reproductive system in a population may not be detected for many years.

Thank you.

Senator HUMPHREY. Thank you, Dr. Smith.

[The prepared statement of Dr. Smith and additional material follow:]

Statement

by
Carol Grace Smith, Ph.D.
Associate Professor, Department of Pharmacology
School of Medicine
Uniformed Services University of the Health Sciences

Before
Committee on Labor and Human Resources
Subcommittee on Alcoholism and Drug Abuse
United States Senate
97th Congress

on

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United States Senate

Mr. Chairman, and members of the Committee I am Dr. Carol Grace Smith, Associate Professor, Department of Pharmacology, School of Medicine, Uniformed Services University of the Health Sciences. I am not here before you representing either the Uniformed Services University or the Department of Defense, but rather as a scientist trained in pharmacology and reproductive physiology. I am happy to have the opportunity to appear before you to comment on new research findings on the effects of marijuana on the reproductive system.

Marijuana is most widely used by adolescents and young adults during the reproductive years. Clinical observations and early laboratory studies indicated the possibility of disruption of the reproductive system caused by chronic, intensive marijuana use, but few definitive studies had been done. It was difficult to quantify the actual amount of drug use by young people and to make positive correlations between drug use and changes in reproductive parameters. Legal and ethical considerations have prohibited the administration of marijuana to adolescent boys and girls or to young women who might become pregnant.

It is now apparent that carefully controlled studies which measure blood levels of the drugs are necessary to clarify these problems. Daily and cyclic changes in hormone levels must also be considered. Further, it is important to both define the effects of drug use on reproductive hormones and then determine if the changes in hormone levels are sufficient to affect fertility.

The reproductive system is unusual among bodily systems in the complexity of mechanisms that control it and that must operate in order for it to function. One of the best experimental animal models for studying the human reproductive system is the rhesus monkey. The female has a roughly 28 day menstrual cycle that is controlled by the same gonadotropins (LH and FSH) and sex steroids (estrogen and progesterone) as the human menstrual cycle. These monkeys can be administered specific amounts of marijuana and other drugs and reproductive parameters can be examined directly. A number of studies which have contributed to our understanding of the effects of marijuana on the reproductive system have been done in rhesus monkeys. Other studies have been done in nonprimate animals, and a few studies have examined the effects on the human reproductive system of chronic marijuana use.

The currently available information from animal and human studies, shows that frequent and intensive marijuana use is associated with certain risks to the reproductive system. While there are still many unanswered questions, a few general statements can be made.

1. The THC in marijuana can inhibit the hormones that control sexual development, fertility and sexual functioning. These effects can be observed in both males and females. The disruptive effects appear to be mediated primarily through an inhibition of the pituitary hormones, although direct effects on the ovaries or testicles and other reproductive tissues may occur with the chronic use of the drug. Thus, marijuana or THC administration can produce infertility in both male and female animals, but the effect appears to be reversible in sexually mature animals.

2. Although marijuana may not have direct toxic effects on the developing embryo or fetus, effects on placental function may inhibit the completion of successful pregnancy. In rhesus monkeys, THC treatment was associated with an increased reproductive loss primarily in the latter part of pregnancy (fetal deaths, stillbirths and neonatal deaths). In addition, the birth weights of infants born to THC treated mothers were significatnly less than in control groups. The current evidence indicates a drug related interference with placental function as the mechanism for these effects.

3. During adolescence and puberty the neuroendocrine mechanisms that will be necessary for a normal fertility are being established and may be more vulnerable to the effects of marijuana. Puberty is a process of complex physiologic changes resulting eventually in reproductive maturation. The term adolescence is generally used to describe the period of development that precedes full reproductive competence or puberty. Our understanding of the processes that control adolescence and puberty, although incomplete, have advanced significantly in recent years.

The prevailing hypothesis to explain the initiation of puberty postulates that there is a highly sensitive negative feedback mechanism for the action of gonadal steroids in the hypothalamus that holds gonadotropin secretion in check prior to puberty. The exact mechanism that initiates the onset of puberty in primates is unknown. The early events, however, are very dependent upon the development of the episodic (pulsatile) release of LHRH, a hormone from the hypothalamic portion of the brain. This LHRH causes the secretion of the gonadotropins LH and FSH. Apparently, the limiting factor to pubertal development in primates is not the gonad or the pituitary but rather hypothalamic secretion of LHRH.

The role of hypothalamic LHRH in the onset of normal pubertal development is an important consideration when postulating an effect of a drug such as THC on pubertal development. Preliminary studies in both male and female rhesus monkeys show that THC inhibits gonadotropin secretion; an effect that is reversed by LHRH administration. Of further concern are the observed effects of short-term THC administration on the menstrual cycle. Our studies in rhesus monkeys show that 14 days of treatment with THC produces disruptions in their menstrual cycles that last as long as 5 to 6 months. These cycles are marked by an absence of ovulation and normal cyclic patterns of hormones. The early menstrual cycles in adolescent girls demonstrate similar irregular patterns, as the mechanisms that will establish normal cycles are developing. Thus, drug-induced disruption of these early cycles could cause major problems during pubertal development. If the inhibitory influence of the drug persisted for a sufficient period, permanent infertility might be the possible outcome.

The effects of THC or marijuana administration on aspects of pubertal development have been studied in laboratory animals. Both chronic and acute treatment with THC lowers plasma LH and testosterone levels in male mice and inhibits prostate gland growth. Interference with testicular development was shown in rats treated daily during puberty with THC, and chronic administration of cannabis extract has been shown to suppress spermatogenesis in rodents. Alterations in sexual behavior have been observed in rats treated early in life or in adulthood with various cannabis derivatives. These studies, while limited to the male, indicate that THC and other cannabis derivatives have effects on sexual differentiation in nonprimate species.

Conclusion

It now appears evident that marijuana or THC can produce disruptive effects on the reproductive system. The studies during the last several years have provided a number of important answers to questions about the reproductive consequences of marijuana use. Several important issues remain. A point of major concern should be a clear definition of the extent of drug use that is necessary to produce disruption of reproductive function and to what extent tolerance to the inhibitory effects of marijuana occurs. Other important issues include the effects of marijuana on the developing reproductive system and the combined effects of marijuana and contraceptive drugs on the reproductive system.

Disruption of reproduction is a subtle process which may be detected only when fertility is desired. For this reason, drug effects on reproduction in a population may not be detected for many years.

A

RESPONSES TO ADDITIONAL QUESTIONS

A major unanswered question on the effect of marijuana on the reproductive system is a further confirmation of the effects observed in laboratory studies in human users. This should be a clear definition of both acute and chronic drug effects in men and women and a determination of the extent of tolerance to the effects of the drug. Obvously, many young people who use marijuana are not trying to conceive, so that temporary disruptions in fertility may not be apparent or seem to be important. However, a number of the recent reproductive studies with marijuana were initiated out of a concern by clinicians working in infertility. Several have observed cases of temporary infertility in women who regularly used marijuana. One small study at the Masters and Johnson Institute in St. Louis confirmed the occurrence of "defective cycles" in young women who used marijuana regularly. The exact role of marijuana use in the disruption of fertility remains to be established. Further, the role of drug abuse in general in the increasing infertility rates needs to be carefully examined.

Other important questions relate to drug use during pregnancy. It is apparent from the current literature that marijuana is not a potent teratogenic or mutagenic agent as was once believed. Rather, the current information (and a clinical study soon to be completed) shows rather remarkable effects on fetal growth and development apart from the production of classical birth defects. The pregnancies of THC-treated animal mothers are more likely to terminate early, and there is an increased incidence of fetal or neonatal deaths. The offspring are likely to be smaller, have learning deficits, and may have abnormal sexual development. To what extent these effects will be observed in human pregnancies remains to be seen. It is clear, however, that studies in pregnant animals provide an important method for screening for reproductive effects of all therapeutic drugs in current use. Most obstetricians will warn patients about the use of any drug during pregnancy, particularly those that have been shown in animal studies to produce effects on offspring. There is certainly adequate evidence available to add marijuana to the list of drugs that should not be used during pregnancy.

All of the current evidence shows that the reproductive effects of marijuana on adult individuals are reversible with discontinuation of drug use. Even with continued drug use, it is likely that tolerance will develop and reproductive function may return. What is not clear is that use of marijuana during periods of critical development will produce only reversible effects on the reproductive system. Adolescent development appears to be particularly vulnerable to disruption by marijuana use. Drug effects during this period may produce a permanent disruption in fertility and sexual function. Such effects have been observed in laboratory studies. Some disruption in sexual development has been observed in young patients by pediatricians, but no systematic survey has been done.

Senator **Humphrey**. Dr. Macdonald?

Dr. **Macdonald**. Senator Humphrey, can you hear me from here?

Senator **Humphrey**. I think it would be best if you pulled that microphone over.

Dr. **Macdonald**. Senator Humphrey, I am delighted to be here. I am flattered that you would ask a man who has seen his life as a failure. I am a pediatrician who has not done what I set out to do when I began this business 19 years ago. I had ideas that what a pediatrician was supposed to do was to help kids grow up to be responsible, healthy, happy, productive individuals.

I really believed at the start that I was going to do that for all of the children who came into my practice. I realized after a while that there were premature babies and children with problems such as leukemia that I was going to lose. Now, with my new understanding, I feel that probably, of those 5,000 or 6,000 newborns that I have had the privilege of taking care of, one-third of those kids are not going to grow up to be mature, responsible adults, and that is a horrendous failure and something I hope we can do something about.

My knowledge of this is primarily through private pediatric practice. I used to see children in the office with complaints that I did not understand, like fatigue. I always thought that fatigue was "mono" and hepatitis and anemia, and things that I was really well trained to handle, but none of those tests came up positive much of the time.

I saw children with cough and sore throat, and I thought those were symptoms of allergies or pollutants or something in the air that I was trained to deal with. I never asked them appropriate questions like, "How are you doing in school," or taking a look at the child to see whether he had any life in his eyes, or asking the parents what kind of friends he had—the things that I realize now are a part of a syndrome that is affecting large, large percentages of our adolescents.

I guess I was trained to believe that drug abuse in kids was needles in the arm and skidrow bums and heroin addicts. I live in the community of Clearwater, which is a beautiful little town with middle-class people who do very well, and I see their kids failing.

It is interesting that when I talk, which I do a lot, other pediatricians, as I describe this syndrome, will come up after it is over and say what I said 3 years ago. "I saw two of those kids yesterday and I did not know what they had." I will find others who will call me back the next day and say, "You know, I saw one of those kids in the office this afternoon."

I come from a position of never having seen a child who did drugs 3 years ago. Now, I see one a day, and it is because my eyes are open to different things.

The question, I guess, today is does marihuana cause changes in behavior, and the answer is of course it does. It also causes nonchanges, and that may be even more important. The great psychiatrist, Freud, or Piaget, the psychologist, or Erickson, all talk about the important developmental things that have to happen in adolescence if you are going to become a responsible adult.

You know, Freud talks about the sexual identification that is a part of the adolescent developmental process. Erickson says that you may be 18 or 19 or 20 before you can develop intimate sexual relationships, rather than just sex in isolation. Piaget talks about development of abstract reasoning or concrete reasoning, without which you cannot do algebra. It also means that you cannot become a moral adult person in terms of a real perception of God.

When you are talking about kids at 9, 10 and 11 becoming involved with this disease or these chemicals, you are talking about kids who are not going to grow up, and you are talking about a society of preadolescents, even though they may be 35 or 40.

I want to talk just a little bit about the way I see it developing. Kids do not become skidrow burn-outs the first time they take a joint; there is a progression that occurs. It seems almost inevitable, as they get started, unless something changes, that they are going to go downhill.

A child takes his first joint innocently enough from a friend or an older sibling. It is the thing to do. It is "in." It is just part of his culture. He does not see it as a terribly bad thing, although he usually, refuses, the first few times to participate. He may not get high the first couple of times but he may see smoking as a relatively exciting way to belong to a new group of kids. He is accepted now by kids who seem to be having more fun.

The hooker in this whole business is that it feels good. There are a lot of reasons for kids doing drugs, but one of the main reasons is it makes you feel fantastic. Unfortunately, it causes problems which make you feel down. In the second stage, which we call seeking the mood swing, that child is looking now for the high to deal with difficulty. The difficulty is obesity; it is "zits"; it is a father that does not understand him; it is algebra; it is a whole load of things.

Behavior starts to change; he loses his motivation. Now, I do not know whether amotivation is all specifically marihuana or whether it is also related to the fact that he is hanging around with kids who have also lost motivation, or whether it is related to simultaneous alcohol use, which almost all of these kids get into.

In our treatment program alcohol and marihuana are the primary drugs, and almost all of these kids use them both. In my studies, at Straight, our adolescent treatment program, which have been confirmed elsewhere, 99 percent of the kids are using both drugs. If you were to ask what their main drug was, about one-third of our clients are primarily alcoholics and about two-thirds are primarily marihuana users. But even though they become involved with cocaine and LSD and PCP and lots of other things, marihuana becomes the main drug for most of these kids going down the slide.

Their school performance changes. They start pulling away from their families. Their dress changes. They start to hurt and they start to use drugs more often. Then they swing into a daily use pattern of preoccupation with the mood swing, where the whole business of life is getting high. The only time they really feel good is when they are high.

It starts to cost money, and they get money in a variety of ways, mostly illegal. They start to change. Their school is a disaster. The police start becoming involved. The family is a disaster. All these things are occurring, and this child who started out relatively simply now wakes up in the morning and plans his day around—"Am I going to have my first joint on the way to school, or am I going to wait until I get to the washroom, or am I going to go to school at all?"

But the concern is not just the behavior that is showing on the outside as these drugs are used; it is what is happening inside these little kids. Universally, they are starting to feel depressed as they come down from their mood swings. What I am saying is that this is maybe 10 percent of all of the high school seniors—the kids we are talking about up here—feel depressed and down.

Suicide rates have tripled in adolescents in the last 20 years; 5,000 of our young people committed suicide last year. Children who are preoccupied with drugs all feel crummy, except when they are high. The leading cause of death in college students now is suicide. The progression is down to the burn-out, where there is no more euphoria and where there is a physical deterioration, cough and sore throat, and all the things physicians can pick up more easily than behavior change. We need to diagnose children much earlier, and I think we will as our awareness grows.

A lot of our kids are not going to make it. I guess what I would like to say sort of in conclusion is just a couple of thoughts. What are we going to do when those kids, who now are chemically dependent, grow up and become adults dealing with their own children?

I get comments from junior high principals like, "How can I talk to this kid's parents about his drug involvement when theirs is worse?" These kids are going to be parents, and when their kids are 9, 10 and 11, what is going to happen to the epidemic then?

I started my remarks by saying that I failed, and I believe I have. I am making changes in terms of the way I have parents deal with their children. I think we need to understand that parenting is not what we thought it was 5 or 10 years ago. We need to control our kids and we need to feel responsible for them.

The pendulum of children's rights needs to swing. Parents need rights to protect their kids which seem to have been taken away from them. A child is not allowed to run out on the highway when he is 3. He should not be allowed to smoke marihuana when he is 15.

In terms of failure, we as a country will fail and you as Senators will fail if we do not understand what is happening and do something about it.

Thank you, sir.

Senator HUMPHREY. Thank you, Dr. Macdonald.

[The prepared statement of Dr. Macdonald follows:]

REMARKS TO SENATE COMMITTEE ON ALCOHOLISM AND DRUG ABUSE

October 21, 1981
Washington, D. C.

Our children are in trouble. A new epidemic is overwhelming millions of them at a most vulnerable time in their lives. Those diseased will either die early or go on to lead unproductive and unhappy lives as chemically dependent adults.

I've been a general pediatrician for 19 years and have seen many changes in those years. When I began practice I did so with the belief that I would be a part of families that raised children to become happy, healthy, productive and self-diciplined adults. I was well trained to deal with meningitis, pneumonia and a host of organic diseases and have done well in dealing with those problems. I was ill prepared for this major new disease.

More recently I have been associated as Director of Clinical Research with Straight, Inc. an adolescent drug treatment program. But I'm still primarily a general pediatrician in private practice. Those newborns that began practice with me are now the society in danger.

When a teenager was brought to my office because of fatigue my thoughts used to run to testing for "mono", anemia or subclinical hepatitis. I never asked the questions which would have led to the diagnosis of drug or alcohol abuse.

When an adolescent arrived at my door with symptoms of cough or sore throat I suspected allergy or asthma or infection. Now I realize that many of these children smoke and not just tobacco.

Making the diagnosos of drug use is done primarily on the basis of changes in the childs behavior, attitudes, and appearance. Testing his urine for products of marijuana is helpful in diagnosis and followup but knowing the clinical picture is the basis for real understanding and identification of the disease.

Both the American Academy of Pediatrics and the AMA strongly condemn the use of marijuana in the adolescent. Basic to these statements is the understanding that the process of emerging from childhood to responsible adult life involves a number of major changes. These changes tend not to occur or become distorted if a child begins to rely on chemicals for dealing with his problems. Adolescence is a rough time during which the problems are multiple. Difficult to deal with are such things as acne, obesity, algebra, not making the team, getting turned down for dates, being misunderstood by father, boredom and many others.

People fail to appreciate adolescent drug abuse when they think only of the burned out skid row bum or the hard core heroin addict. Children begin their drug use in relatively innocent settings receiving them initiation from classmates or siblings. This introduction to drug use which we call "Learning the Mood Swing" is occuring in increasing numbers of our children using stronger and stronger chemicals at younger and younger ages. In this stage the child may be experimenting with alcohol and marijuana. Most importantly he is learning about chemical euphoria.

For many, probably over half, adolescent experimenting isn't enough and Stage II, "Seeking the Mood Swing" is entered. Here other drugs such as Quaaludes and Speed may be added. Now the child may buy drugs and uses them to deal with stress. The drugs begin to change the child and his family. The amotivational syndrome begins with such things as dropping out of extracurricular activities or finding school "boring". School performance may suffer and truancy begins. His frinds are changing as is his appearance. At home his mood swings become noticable and he is becoming a con artist. Unfortunately the dual life of being one person at home and another at school and the increasing problems associated with school and friends put increasing pressure on the child. For many this leads to more and stronger drugs and on to Stage III.

Of those 85 - 90% of our children who make it to 12th grade at least 10% have entered the stage of "Preoccupation with the Mood Swing". These children live to get high. School and family relationships are a disaster. Brushes with the law are increasingly frequent. Selling drugs and other illegal activity becomes necessary to support an increasingly expensive habit. But perhaps worst of all is what's happening inside this seemingly "cool" and "laid back" child.

When not high his self image is close to zero. He's guilty and depressed. Suicide is an increasingly frequent thought. Suicide is now the 2nd leading cause of death in adolescents and has tripled in this country in the last twenty years. Among our college students it ranks as the number one killer. Accidents, our leading killer of adolescents, are strongly related to chemical use and many more than we suspect are probably suicides. The child in Stage III will not recover without treatment or miracle. He will either die or eventually pass to Stage IV the burnout stage.

In my practice I see children in all these stages. As recently as a few years ago I never mode the diagnosis of chemical dependency. Now in the same practice I make it almost daily. This is due not only to the increasing frequency of the disease but also the fact that I now have my eyes open. Unless we can reverse this trend we will have failed our children and our society. For the millions already lost to this potentially treatable disease we must grieve and pray. On our shoulders rests the responsibility of protecting the next wave of children from a similiar catastrophe

Reference

The Clinical Syndrome of Adolescent Drug Abuse. Macdonald, D. I., and Newton, M. N., Advances in Pediatrics Vol 28 (1981).

Senator HUMPHREY. Dr. Lantner?

Dr. LANTNER. I would like to thank you for the opportunity to share my clinical observations with you.

I would like to stress a few points. As Dr. Macdonald, I am a clinical pediatrician who was never trained in drug use, and I noticed what happened to my patients because I enjoyed seeing teenagers and following up on what happened when they went to college, and so on.

In my opinion, marihuana definitely is an insidious, cumulative drug which is creating physical, mental, and emotional problems for all regular users, but it certainly is very devastating in young children and teenagers.

I notice that the symptoms are so repetitious that even if the symptoms are very insidious at the beginning, after a while one can follow the patient and almost predict what the future symptoms would be. I think it is impossible to recognize an occasional user, but any regular user would finally develop more specific symptoms. I think school performance decreases more regularly.

Of course, one should remember that the very outgoing, bright child can maintain the appearance of a fairly decent student for a while. They compromise, however. They change their life goals, and so on. I think we should recognize that the appearance of a person who uses marihuana regularly is quite often deceiving.

Like one of my patients told me, "The outer shell of me has not changed that much. I myself know how empty I am inside, and there is hardly anything left that I still like of myself." Marihuana did that, and I think we should recognize that.

The person who has average intelligence does decrease faster in school performance, and the school performance decreases because of the short-term memory loss, and that is very real, I think. I can give you some examples, again, that really suggest that not only do they read a page and they cannot remember the page, but they start forgetting simple things, like the phone numbers of friends they have called for a long time. Teachers who work in classrooms cannot remember the names of the students he has taught for 2 years.

They forget their own birth date which, at the beginning, I could not believe. A person has to check his own birth date to be correct about the time when he was born. Concentration does decrease, and so does also the cognitive thinking. Because of that, math ability especially does decrease. People who used to be very bright in advanced math are going down to average classes and gradually dropping out of math, and so on.

A motivation is a very, very real symptom. It comes to a point where everything is a strain—not only the schoolwork, but everything. A patient of mine told me:

> At the beginning, it was really fun. We would go to the park; we would kick the ball; we would play Frisbee. We would sit around, smoke a few joints, and have fun. Then it went to the point where we were starting to smoke more regularly, and we would just sit and smoke and stare at each other. We would not care whether anything happened.

Then he said:

> Now, I just sit by myself and smoke, and frequently I do not even have the ambition to turn on the light or listen to my radio. I just sit and smoke and feel so depressed and so lonely and so desperate.

I think we are creating a tremendous amount of young people who are not prepared not only for scholastic achievements later on or for any kinds of goals, but who are not really able to function in average adult life.

I think we should recognize that we see more and more young children using marihuana, and by that I mean 9-year-olds, 6-year-olds, 2-year-olds. These are people whose family members are using marihuana, and they are developing the attitude of drug use before they even have any idea of what it means to have fulfilled any kind of life goals, any kind of attitude not to repeat the same mistakes, and how to know how to cope with problems, and so on. I think that is a real problem.

I would like to also stress the point that I have followed up, within the last 2½ years, about 50 children and teenagers who cannot function in everyday life. I mean, these are not just children who are going down in school grades; they cannot function in everyday life because of their depression, the feeling of isolation, the feeling of paranoia, and the feeling of complete worthlessness with no self-esteem whatsoever.

I would like to bring the message across that I am convinced that many of these people will never bounce back to their original potential. I would like to also quote a 12-year-old patient of mine who says, "I love pot; I love the buzz. That is all I am going to do. I started at the age of 8 and I do not care what I do in my life."

Even if you can stop this 12-year-old from using pot, how do you turn him back to the age of 8 and start rehabilitating again? We see this again and again—the teenagers who have blocked out the most important time in their lives when they had to develop social attitudes, emotional attitudes, friendships, and so on. You cannot take away the harm done.

In my opinion, we should not question if marihuana is a health hazard, physical and emotional. We should really question how we can stop this epidemic and how we can educate people so that this drug is not used. We know that there is a vulnerable group of people who, of course, always will try to use psychoactive drugs to escape reality—people who are unhappy with whatever happens in their lives, with family problems, school problems, coming into a new school, new city, and so on.

But the majority of our youth who use marihuana do not belong to that category. The majority, in my opinion, are the people who use marihuana because marihuana is a mild drug versus a hard drug. There are many teenagers and young adults who would never use drugs, in their opinion; they will use marihuana because it is a recreational fad, and I am quoting them. It has no side effects; it is not addictive; it is not cumulative, and so on. Of course, we should get rid of this myth.

I feel that the hazard of marihuana decreasing scholastic achievement is far greater than the pulmonary problems, endocrine problems, and so on. I feel that a healthy, well-functioning brain is certainly our best part of our bodies, and if we are destroying that, we are destroying a tremendous amount of the potential of our youth.

I also just wanted to mention that we are certainly increasing not only people who will not be able to function in life, but we are increasing people who will do irrational petty crimes, violent crimes, and irrational crimes. The marihuana smoker is known as being mellowed, so-called, and a passive addict. That is true, unless this individual is challenged, interrupted, or aggravated.

I have many parents who have told me that they are afraid of their teenage children. Not only is verbal abuse a concern, but physical abuse. I actually have parents who have hammers next to their beds, and they do not dare fall asleep before the children fall asleep. They have learned not to disturb these young people when they are acutely high, and I think you should look into that. People do not like to talk about that. Not to repeat so-called reefer madness, but I think it is a real thing and I hear this again and again from responsible parents who are not making up these stories.

I would like to make some suggestions. First of all, I feel that the parent groups, especially organizations like the National Federation of Parents for Drug-Free Youth, should be supported as much as possible, because I feel that these groups are the most effective groups throughout the whole country because the parent certainly is losing the most if a child is going downhill on drugs.

I feel that the medical profession should be involved to the utmost. I feel it is irresponsible—and I have no excuse for that—that people like the American Academy of Pediatrics is doing so little in the prevention of drug use. The American Academy of Pediatrics has not had one workshop in all these years when the health hazards of marihuana have been published and are available for anybody who wants to read about the health hazards of marihuana.

The National Institute on Drug Abuse offered to have a workshop at this fall conference in Atlanta, Ga., for the American Academy of Pediatrics. The answer was that there was no time and space available for this important workshop.

I feel the media should be updated. Every child from kindergarten age on should know about the long-range consequences of marihuana. I feel very strongly that most children do want to be healthy and stay healthy. As one patient of mine told me:

> The short high of marihuana really is not worth all of the long-range consequences. If I would have known ahead of time what was going to happen to me and how my life was going to change, I would not have started.

I think it is most important that we try to do all these things. I feel that at this point, it is almost a question of survival. I do not believe that we can sustain ourselves as an intelligent, intellectual society if we let this drug use continue.

Thank you.

Senator Humphrey. Thank you, Dr. Lantner.

[The prepared statement of Dr. Lantner follows:]

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UNITED STATES SENATE
COMMITTEE ON LABOR AND HUMAN RESOURCES

HEARINGS ON HEALTH AND EDUCATIONAL EFFECTS
OF MARIHUANA ON YOUTH

October 21, 1981

Witness: INGRID L. LANTNER, M.D., F.A.A.P.
Pediatrician

Based on my clinical observations since 1978, it is my considered opinion that the use of marihuana creates health hazards, both physical and mental, in all regular users. In the case of children and teenagers, its effects are devastating. The physical hazards are outweighed by the fact that its chronic use interferes with their goals, their education, and their emotional and social maturation: indeed, its regular use can lead only to mediocrity. Marihuana is a drug which develops tolerance and addiction, causing definite withdrawal symptoms. I hope that we can concentrate all of our efforts nationally in alerting the American people to, and in educating them regarding, the latest research findings.

I have practiced general pediatrics in the same middle class area since 1956. Several years ago I began to detect subtle changes in many patients as I compared them with patients in my earlier years of practice. In many instances, their physical symptoms, as well as their attitudes and interests, were appreciably different. Three years ago I began to suspect strongly that these differences were the result of cannabis use. Since 1978 I have carefully followed some fifty patients who used drugs. In addition, through my talks to over 150 student groups, parent-teacher organizations, and radio and television audiences, I have had opportunities of talking informally with more than a thousand cannabis users.

The similarity of their symptoms, regardless of how insidious they were at the beginning, has brought me to the conclusion that a specific marihuana syndrome does, indeed, exist. It is important to emphasize that I became aware of certain symptoms such as amotivation, decreased school performance, and physical and personality changes long before I became aware of research findings either from animal studies or from clinical observations, almost identical to mine, by other physicians such as Drs. Stanley Dean, Roy Hart, Doris Milman, Donald MacDonald, John Meeks, and Harold Voth.

Only be knowing the individual before, during, and after the use of this drug can one appreciate fully the decreased potential caused by this accumulative intoxicant. To the untrained eye, some marihuana addicts appear to be functioning normally, and only a few users are able to recognize their impairment, such as one girl who stated to me, "My outer shell has not changed much. Only I know how empty I am inside. There is hardly anything left that I like about myself, and pot did this." Unlike this girl, the average user is able to recognize that he has had an impairment only after complete abstinence from the drug when his functions have been restored. This changed judgment about their compromised life styles, goals, and every day accomplishments, together with a denial that a problem exists, makes treatment of cannabis addicts most difficult. Only a fraction of them will stop without intervention. Instead, many of them will eventually become multiple drug users by adding alcohol, "speed," tranquilizers, PCP, and other mind-altering substances.

As a pediatrician, I am concerned because the use of marihuana has reached epidemic proportions among our school population. It is now used even in grade school, and the average age when it is first encountered is between 11 and 13. Children much younger are frequently exposed to it if other members of the family use it.

We are observing a slight decrease in use in those areas of the country where drug education programs are underway through the combined efforts of the National Institute of Drug Abuse, "grass roots" parent groups, and the National Federation of Parents for Drug Free Youth, an especially effective organization. Nevertheless, the use of marihuana and other drugs is still, in my opinion, the most common, most serious single deteriorating health factor in our pediatric population. I feel strongly that the medical profession, especially pediatricians, should consider prevention, early intervention, and treatment of drug users as their top priority.

The problem of eradicating marihuana addiction is one of special difficulty, because marihuana is still considered by many, including some health professionals, to be a "mild, harmless" drug, not in the category of hard drugs. Yet, the increased strength of marihuana over the last few years is responsible for making the symptoms develop sooner and more strikingly, since the effects are time and dose related.

The most reliable symptoms of chronic marihuana use are decreased school (or work) performance and distinct personality changes. Amotivation, constant tiredness, an inability to concentrate, a decreased short term memory, and the inability to do cognitive thinking make the maintaining of school grades difficult for most children. One of my patients summed it up this way:

> "Everything became a strain, and I stopped worrying about my homework and tests. I would read the same page over and over without comprehending it. As time went on, I even had a hard time remembering the phone numbers of my friends, whether I took my vitamins, and where I parked my car."

Some bright, outgoing individuals, who were originally strongly goal-oriented, are able to perform their tasks for awhile without drastically noticeable deterioration. In due time, however, they all compromise in their studies, selecting easier courses and settling eventually for a mediocre life style with simpler goals, or perhaps no goals at all. The average student's grades drop more readily. Those youngsters who have learning difficulties or whose intake of marihuana is higher develop the typical "pot head" or "burnout" syndrome rapidly.

Every school has its numbers of impaired, pathetic individuals as a result of drug use. They are neither able to continue their education nor able to function properly in their daily activities. Most of them drop out of school, becoming emotional, social, and occupational drifters. They lead a marginal existence, often being supported by their parents or society. Their use of marihuana makes social contact unnecessary to them, their only concern being to get enough of this intoxicant to shut out the rest of the world. They become useless to society, or perhaps even dangerous. Many of them become involved in petty crimes, while others are responsible for irrational and even violent behavior.

Despite the known fact that most regular marihuana users are totally languid and uninvolved ("mellow" in their terms), this condition is often changed by aggravation or intrusion. Several parents have told me about their fears, not only of verbal but also of bodily abuse, and they have learned to leave the acutely intoxicated youngster alone. The drug user with borderline mental problems is especially vulnerable, and truly psychotic episodes may occur.

Of course, not all marihuana users become "pot heads." Certainly, none of the beginning users intend to become "pot heads." They start because, to use their words, "it's the thing to do," because they are "curious," and because they "like the buzz." There is, of course, a more vulnerable group of individuals, those with personal or family problems who use psychoactive drugs to change reality and to forget these problems. And children are not different in this respect. In my opinion, however, the majority of school children do not fall into this category. They use "pot" because they are convinced that it is *not* a "hard" drug, yet it still gives the feeling of intoxication without the hangover of alcohol. Better still, its use can easily be hidden from their parents. Despite the recent efforts by the National Institute of Drug Abuse and of some parent groups, a large number of people still consider marihuana relatively harmless, without long range consequences.

When drug use is first started, chances are it is used infrequently, perhaps only on weekends. However, because the user develops a tolerance to the chemical THC (tetrahydrocannabinol) in marihuana, he needs a larger or more frequent dose to produce the effect he desires. Also, by mid-week, the weekend user begins to notice mild withdrawal symptoms, such as the jitters or vague feelings of apprehension. So, to allay these symptoms, he smokes a "joint" mid-week. A vicious cycle soon develops, and before long the occasional user becomes a regular user with a serious addiction. In my area, the percentage of high school students using marihuana daily is around 30 percent, a higher figure than is reflected in other studies nationwide.

In due time, these users develop symptoms similar to those of the "pot needs," but to a lesser degree. One of my patients described for me how he became addicted:

> "At first we had fun. My friends and I would go to the park, kick the football, sit around together afterwards for a few joints of pot, and giggle and laugh. As we started using more, we would get high, stare at each other, and hardly talk. Now I prefer to stay by myself and get stoned alone. Often I don't have the ambition to turn the radio on, and I just lay alone in the dark, feeling wasted and very lonely."

Their personality changes become apparent to people around them: forgetfulness, a lack of concern, sudden changes in moods from a flatness of emotions to unexplainable hostility (a "Jekyl and Hyde" personality), a poor self-image, decreased needs for communication, depression, changed eating and sleeping patterns, paranoia, feelings of isolation and alienation, and a withdrawal from the mainstream of life. The aphrodisiac effect which marihuana creates in the beginning with small doses does not persist. Many daily users experience a decreased sexual desire and disfunction.

Marihuana use also interferes with precision timing and motor skills, a fact which accounts for a greater number of traffic tickets, car accidents, and injuries at work among users. Some of the fatal accidents involving teenagers, in my opinion, are planned suicides, for I am told by some patients that suicidal thoughts haunt them often. Some contemplate elaborate ways to end their hopeless lives by hurting as many people as possible to "pay them back, and to hurt them really bad."

A young user suffers the most. His emotional, scholastic, and social development are arrested. After years of his drug habit, he is impaired in all of these functions, making it difficult for him to compete in the demanding adult world. He has hardly developed any drug-free interests or hobbies, nor has he experienced the satisfaction of personal achievement or lasting friendships. I am convinced that many youngsters will never be able to erase totally the effects of this insidious drug.

I wish to focus your attention on the deteriorating effects of marihuana on the intellect and personality, because I believe that a sound mind, with the brain properly functioning at the individual's maximum capacity, is the most precious part of the body. It hurts to see the wonderful potential of our students being wasted. Furthermore, I am greatly concerned about the children of marihuana users, not only because of the genetic implications but also because these parents will be unequipped to give emotional stability, financial security, and guidance so necessary in rearing healthy children. As time goes by, we shall notice even more that the consequences of marihuana use affect all segments of our nation, not just the drug users themselves. We shall reap the consequences if we lose our most valuable resource, some of our brightest and sharpest young minds.

Marihuana has other health hazards also. I notice youngsters with chronic coughs and chest pains, and youngsters with difficulty fighting infections. Girls who smoke marihuana have a greater instance of irregular menstrual periods and a lesser tendency to conceive. Some boys, past the typical age of pre-adolescent gynecomastia, have breasts which continue to enlarge. Most of the teenage marihuana users seem chronically ill, having poor complexions and a "unisex" appearance. Marihuana is especially harmful to children with endocrine and respiratory problems and to those with a tendency toward convulsions. Emotionally labile individuals also suffer more from its long-range effects. Teenagers used to be the healthiest segment of our population, but this statistic has changed.

Healthy bodies will be of little significance, however, if we are unable to prevent the deterioration of the intellect. It hurts to realize that we, a caring and sophisticated nation, have overlooked the beginnings of this marihuana epidemic among our youth. There is no doubt in my mind that marihuana use creates serious problems. If you do not believe my observations, ask any child who isn't using marihuana, and he will be able to tell you this. His words may not be sophisticated, but he will tell you that a "pot head looks weird, acts weird, and is just like an old person who cannot remember things after a stroke." He will also tell you that the "kid on drugs is slow and boring. He often stops right in the middle of a sentence because he has forgotten the beginning of it." In short, he is a "kid messed up with pot for life."

I believe there is still time to alter the present trend of drug use, but doing so will not be an easy task. It will take the concerted and tireless efforts of caring individuals, groups, and organizations willing to address themselves to the problem. I wish to make the following suggestions:

1. We must support the National Institute for Drug Abuse, which is continuing research and making *updated* information available.
2. All children from kindergarten on must be educated about the long-range health hazards of cannabis, stressing the benefits of a drug-free existence.

3. We must encourage all sectors of the adult population --- educators, physicians, mass media personnel, entertainers, private businessmen, etc. --- to become involved in the task of prevention. Several television network programs on marihuana, especially the recent one "Get High on Life," have been helpful. The message about marihuana should be clear and repetitive. We have seen prompt results when the public has been alerted to such problems as toxic shock syndrome, the need for vaccinations, certain soybean milk formulas, and early symptoms of the Ray syndrome. There must be no school child who can say and believe that "everybody does pot, and everyone knows it is harmless."
4. "Grass roots" parent groups and their umbrella organization, Parents for Drug-Free Youth, should be given as much support as possible.
5. There should be adequate facilities available for treating marihuana addicts in all states.
6. Since the majority of present users will most likely continue their drug habits, society should make provisions to create financial support systems for those who will be unable to care for their families and themselves.
7. Insurance companies, industry, schools, etc., should routinely check people for chronic marihuana use and should offer users free or inexpensive treatment. In the long run, such action will save considerable money by improving productivity and by decreasing accidents and absenteeism. At the same time some people can be helped to enjoy proper health and to become better, more loyal workers.

8. Strong measures must be taken to decrease the availability of illicit drugs and drug paraphernalia. Prescription drugs must also be dispensed more sensibly.

Propaganda by the illicit drug industry, promoting the use of drugs, makes the problem of fighting the use of marihuana enormous. But, if we want to survive as an intellectual society, able to compete with drug-free countries, we have no other choice but for all sectors of our society to work together toward this end now. We have risen to difficult challenges before, and we can do so again.

Senator HUMPHREY. Dr. Cohen, you focused on the problem of those who use marihuana and drive, among others. Are there any statistics? How great a threat is it to those on the highway who are sober, if you will, or free from drugs—how great a threat do drug users represent to others?

Dr. COHEN. Well, we have to add the threat of marihuana to the threat of driving under the influence of alcohol, which I believe is quite considerable. I think the data speaks for itself.

The concern is that we are going into a phase of combined alcohol-marihuana use and of heavy marihuana use in driving, and this will add to the mortality statistics that we now are shocked by with alcohol alone. So, I think it is a real threat and an unfortunate one.

I was going to bring with me a water pipe which can be attached to the dashboard so that one can smoke while driving. Unfortunately, the local paraphernalia shop near UCLA was out of them; they promised me one next week. But I was going to present you with it, Senator Humphrey, and I am afraid I cannot do it today.

Senator HUMPHREY. It is just as well.

How effective are the tests used to determine use of marihuana among drivers? Are they in widespread use, and are they effective?

Dr. COHEN. They are coming into wider use. In the last 2 years, they have been developed and now many police agencies are using them. We are using them in a number of counties in California. There is only one problem with them that still requires further work.

Marihuana, as you must know, lays around in the body a long time. A single joint may not be excreted completely and may still be detectable after a week or so. So, when one finds marihuana in the bloodstream, the crucial question is is this recent use of marihuana within the last hour or so, or is this remote use of a few days ago, in order to determine whether the driving incapability is due to marihuana.

Although some people claim to be able to distinguish recent THC derivatives from remote THC derivatives, I think this still has to be worked on.

Senator HUMPHREY. The symptoms exhibited are about the same as someone under the influence of alcohol, is that correct—erratic driving and taking chances?

Dr. COHEN. Do you mean the intoxication?

Senator HUMPHREY. Yes.

Dr. **Cohen**. It is a little different; it is not so overt. There is less staggering and slurring of speech, but it is more of a fantasy, dreamy state which people are in. As I tried to describe, they have the loss of many skills which are required for driving an automobile. But being stoned on alcohol and being stoned on marihuana are different. Of course, when they are combined, then all bets are off.

Senator **Humphrey**. What are the actual effects of driving under the influence of marihuana? Do people wander on the highway, or do they take chances?

Dr. **Cohen**. There is a wandering and a shifting from lane to lane. There is poor timing judgment; that is, if you want to pass a car, you may be a little wrong in the time estimate as to how long it will take you to pass that car. Your reflexes are delayed.

What is quite important is you do not remember what you just did. In other words, you come up to a red light, you stop, and then you have to look at your foot to see if you put your foot on the brake. Your immediate recall is impaired with marihuana.

Senator **Humphrey**. I see.

Dr. Smith, you have talked about the effect of marihuana on reproduction. Is there anything yet that could be described as fetal marihuana syndrome, in parallel with the fetal alcohol syndrome.

Dr. **Smith**. I think the effects that have been reported in several published clinical studies of women who have used marihuana do not show a syndrome similar to fetal alcohol syndrome but rather an overall retardation of growth that occurs during gestation.

The placenta really has two functions. One is to nourish the baby; the other function is to metabolize things that might be dangerous to the baby. In the attempt to protect the baby; that is, to metabolize the ingredients in marihuana the drug is disrupting the other placental function, the ability to nourish. There is also a study underway now that indicates that the combined use of alcohol and marihuana produces a more typical fetal alcohol syndrome than alcohol alone. I would have to say that, in general, we do not have a specific fetal syndrome for marihuana.

Senator **Humphrey**. Well, to the extent that studies have produced findings in this regard, what are the effects on the unborn of marihuana use by the mother?

Dr. **Smith**. One general classification of effects would be an overall growth retardation. There are several stages throughout the life of an individual when sexual development takes place. One, of course, is the sexual differentiation that occurs during gestation. At the current time, we cannot say what the effects of marihuana are on this development. There are animal studies, of course, that indicate disruption in sexual development. One of the things that we have to be very careful about is that we do not generalize too fully from animal studies. Studies that are done in monkeys are much more applicable to the human reproductive system because primates develop considerably differently from nonprimate animals.

We have a study that will begin after the first of the year on adolescent development. We will be studying the offspring of mothers that have been treated with marihuana either during pregnancy at different stages or during lactation. We will be able to determine if there was impairment of their reproductive development.

All of these studies on the reproductive system have been funded by the National Institute on Drug Abuse for the last 7 years.

Senator **Humphrey**. You mentioned the effect on the growth of the unborn. Does that mean that at birth babies are undersized or they are not fully developed, or what are you getting at there?

Dr. **Smith**. The babies born to the groups of monkeys treated with marihuana are smaller.

Senator **Humphrey**. Are they otherwise fully developed?

Dr. **Smith**. Apparently, there are effects on mental development, what one would describe as neurological problems such as hyperirritability in newborn babies. There also are learning deficits that have been shown in animal studies, but to the best of my knowledge, none of them have been studied in human populations yet.

Senator **Humphrey**. Dr. Macdonald, what are the warning signals that parents should be alert for?

Dr. **Macdonald**. Normal adolescence is a time for great change in children, and it is very difficult for parents to separate out a child's normal changes of wanting to experiment and wanting to do things differently.

I think what I feel, sort of looking back at parents who have been through the stages I have described, is that they knew there was something wrong with their child in a very early stage of adolescent drug abuse, and they were convinced by someone else that it was a phase he was going through, or something that everybody else would do.

It is often difficult for parents, because their children often act differently in other places. If you do not hassle them, they may seem to be marvelous kids. The neighbors may see these children as marvelous, but the neighbors do not know that they are coming in at midnight and do not participate with the family.

I think when a family becomes uncomfortable and understands the numbers showing the extent of drug use among students that are on the board, it has to be very suspicious of drug use and institute the sorts of measures that I believe Dr. Schuchard will talk about, in terms of parents being directly responsible.

I would just like to comment a little bit on this business of how you tell when a child is stoned and what the effects are. You know, that is what the schoolteachers always want to know: "How do I know when a kid is stoned in class?" The answer is you most often do not. I think what they want to know is are their eyes red or are their pupils dilated or constricted, and all those things.

In our treatment group, we play a game called "20 Questions," which is used to impress Senators and people who come to look at the program. One of the things we ask them is, "How many of you have been stoned at the dinner table?" Well, they all have. "How many of your parents knew it?" Almost none of them knew it. "How many of you have gone to a psychiatrist or psychologist?" Most of our kids have. "How many of you were stoned while you were there?" Most all of them. "How many of the psychiatrists detected that?" None.

Marihuana does not produce the staggering, drunken effect of alcohol that you can pick up so much more easily, so that these kids will pass you on the street every day and not be detected. That makes it a very appealing drug to them because of lack of detection. For parents and teachers it makes things very difficult. So, I need to look at behavior changes in the child.

I have just one comment on what Dr. Smith said: There was a study reported to the Society for Pediatric Research in San Francisco last October or November from Boston University where they showed statistical differences in marihuana's effect on the fetus. What they said was that human mothers who had taken marihuana had statistically smaller babies than either those who were into alcohol or tobacco.

You know, one of the problems with asking us to do research—and there are just loads of problems—is that nobody in their right mind is going to do research on pregnant mothers where they give them marihuana. But there are statistics.

I also heard of two infants from Downstate Medical Center in New York, whose mothers had taken only marihuana and no alcohol. They looked very much like babies with fetal alcohol syndrome. That will be reported, also.

Senator **Humphrey**. Let me get back to my question. Your responses were very illuminating and I do not mean to sound like I am criticizing you, but what should parents look for? You say that in retrospect, most parents realized that their kids were in trouble. How did they know?

Dr. **Macdonald**. Well, maybe I am being a little vague because I think it is such a pervasive part of their society that you have to understand that the kids are being exposed. You must have a strong index of suspician and high degree of awareness. You look for whom they hang around with. You look for their school grades. You look for the way they dress. You look for a pulling away from the family, with the understanding that kids are supposed to pull away from their families.

Then I think there comes a stage where this whole business of "do you search a child's room" becomes important. I have had children at age 16 who I had taken care of since birth and in beautiful families who were obviously in this syndrome and this dependency thing. I have suggested to the mother that she search the child's room. It was like I shot her, you know. I could have asked her to put a needle in his heart or take blood out of his arm, and she would have gone along with that. But this whole business of not being able to search your kids—I think you have to be very, very suspicious, if you understand the numbers.

NIDA's survey of alcohol showed that over 50 percent of high school senior boys have had five drinks on one occasion in the last 2 weeks. That is incredible. And over 25 percent have done that three or more times. Our kids are drinking and doing this stuff, and I think you almost have to start from the position that chemical use is the norm and be highly suspicious.

Maybe this is digression again, but somebody says, "Are these bad kids doing this, or are these kids who become bad when they do it?" The answer is both. When you see a child who is not doing well at age 15, he has got to be doing drugs. I just would not understand why a child who was in trouble with the police would not find this way of feeling good, but the other is also true.

Senator **Humphrey**. Yes. So, the answer is that there is not, at least in the early stages, any physical sign that parents can detect, but rather they have to look to an emerging pattern.

Dr. **Macdonald**. Exactly. If I may just say one other thing, I think that waiting for signs is waiting too long. As a pediatrician, I see prevention as my goal. When a mother comes into my office for a checkup with her 2-year-old and I ask her how she is doing, if she says "OK," I say, "What do you mean by OK?" She says, "You know how the terrible two's are." And I say, "What are the terrible two's?" Well, actually, the terrible two's is a phrase that was put into our society that says you should accept rotten behavior out of little kids and not deal with it. We have a real problem there.

A father told me that he was having trouble because every time he wanted to go to the store, he had to take his kid along. I said, "Well, how old is the kid?" He said, "18 months," and I said, "You do not have to do that." So, the pediatric message must begin much earlier than looking for adolescent drug abuse at 15 and 16. It is teaching parents that they have a right to control their child's behavior and be involved much, much earlier.

Senator **Humphrey**. Dr. Lantner, would you comment on the same question?

Dr. **Lantner**. Yes.

Senator **Humphrey**. What should parents be alert for, and how can they prevent this?

Dr. **Lantner**. I think Dr. Macdonald and I see these patients so often that we expect that the whole country knows the symptoms, and I think that is one of our mistakes. I will summarize what I said in the first comment.

First of all, I think I should stress regular physical examination. Disregarding how carefully it is done, it is not going to make the diagnosis of a marihuana smoker because unless there was a specific test for cannabinoids in the urine, all the tests would be negative. So, you have to watch for early symptoms.

I think the insidious part of marihuana is the most dangerous part, because for the first time, I think, we have a drug where the child can be actually high most of the day and the parent would not know it. I have parents who have told me they liked the child best, in retrospect, when the child was high because suddenly he is giggly and talkative and the parents expect that as normal behavior.

So, again, the school performance is something I think you should watch. School performance goes down.

Senator **Humphrey**. Yes.

Dr. **Lantner**. The child drops out of extracurricular activities. The child is constantly tired and is contantly falling asleep in the afternoon. He is just drifting away from the mainstream of life and alienating himself from the family.

Many children do not care how they are dressed, but many do keep perfect appearance, and I think that is something parents should notice.

I have a definite observation that children who come from more affluent families can have symptoms of marihuana for a much, much longer time without anybody noticing, because if a family lives in very close quarters, it is easier for the parents to note that the child sleeps in the afternoon. If a family has a bedroom with a TV set for every single child, the parents actually do not see the child as readily, and that is important to keep in mind.

Symptoms like coughs, chest pains, irregular menstrual periods, and infections which linger on and do not respond to regular medical treatment—all these things are more difficult to detect. I think a child who has been a healthy, young, vigorous, good-looking adolescent and suddenly looks chronically ill—they start developing what I call a unisex appearance. They really do not look like attractive, young teenage boys and teenage girls; they look sick.

There is no question that the chronic marihuana user actually starts looking different, and I would like to summarize these observations of mine. I am sure, sooner or later, these will be published in more scientifically valid studies somewhere else by somebody else.

They look different; the eyelids are lower. I am talking about heavy users who start marihuana early.

Senator HUMPHREY. Yes.

Dr. LANTNER. They are usually shorter; they are thinner. The proportions of the face are different. It appears like the eyes are wider apart; the eyelids are lower. Their expressions are very unemotional. The speech is different; they have very flat, emotionless speech.

It is amazing how many parents ignore the use of marihuana until the point where the rest of the school children notice that the child acts differently. When I think of the term "pothead" or "burn-out," those terms were not developed by physicians or educators or scientists. They were developed by eager, open-minded observers—children—because they noticed that the chronic, young marihuana user actually looked different.

I think we should not ignore the gut feelings and gut observations of these young people, who have no idea about the research studies of NIDA or animal studies, or anything else. They notice that there is something basically different about the child who uses marihuana, and I think if the parents would notice, they would be aware of the early symptoms; they would recognize this and intervene.

Senator HUMPHREY. You are saying that the term "burn-out" is one that is used by their peers?

Dr. LANTNER. That is right.

Senator HUMPHREY. It is not an adult or scientific term.

Dr. LANTNER. That is right.

Senator HUMPHREY. Well, you have described the physical symptoms of a chronic user. Dr. Macdonald, and I believe you agree, has said that in the early stages of use, there is no easily detectable physical sign, but rather changes in behavior.

What should a parent do when he or she suspects marihuana use?

Dr. LANTNER. Well, I feel it is very, very important to intervene as early as possible, keeping in mind that the marihuana user—child or adult or teenager—usually, in most cases, would not recognize his downhill path. I think that is very important to recognize, and that is why, in my opinion, without intervention, most marihuana users will stay marihuana users. In my opinion, they are the most difficult addicts to treat.

So, if a parent expects marihuana use, he has to intervene, which means making a diagnosis and which means talking to the child, looking for clues, like looking for marihuana pipes, rolling papers, and any drug paraphernalia, like bracelets with cannabis leaves, and so on, and confront the child about that. I think that is very important. I think intervention should also be done by somebody outside the family, possibly a physician who is familiar with the signs and symptoms of marihuana.

I cannot stress the point enough that it really impresses me a great deal that marihuana users are very eager to talk to somebody about this, because they are unhappy people. Marihuana is not a happy drug; it makes the person very isolated, depressed, and desperate for somebody to help them.

So, if an outsider intervenes, I think the results are much, much better and much, much faster.

Senator HUMPHREY. Dr. Macdonald, do you agree with that, and will you elaborate on it, if you do? What constitutes intervention? I mean, in practical terms, what does a parent do?

Dr. MACDONALD. Well, from the cradle on, parents need to look at the way they raise the children. When children were asked some things about their use, there were three things in one study that were singled out. One was they felt their mothers did not control them. That is a pediatrician's responsibility. They felt their fathers did not have enough time for them. That is a pediatrician's responsibility. And they felt there was a lack of affection in the home. So, those things need to go first.

I think, though, that what you are asking is what do you do with an 11- or 12- or 13-year-old who is minimally involved with drugs. The expert who I always quote is on the next panel, so I will not say a whole lot about that except that I really support the parent as the key agent in that kind of change and involvement.

The thing you have to understand, though, about marihuana use is that many of these children, although they want to give it up, cannot and that there is no such thing as moderate or controlled use of drugs. These kids should use none, and anybody who says, "Cut down to once a week" does not understand the disease.

There comes a time somewhere in the stage 3 I refer to or late stage 2 where the child has to be divorced from drugs, and you cannot divorce him from drugs in high schools and schools across the country. He has to be physically removed for a period of time to get his body rid of this stuff, then he has to readjust to a new lifestyle which is drug free.

Treatment is required where usage is a little further along. In the early stages the program that Dr. Schuchard will talk about, I support. But even earlier than age 11 and 12 the parent needs to be responsible.

Senator HUMPHREY. The key point is to face the fact, apparently, and to be aggressive and intervene early on.

Dr. MACDONALD. Yes. Just one more thing. I have a child that works for me in the office now; she is 20 and she is an alcoholic. When she was in treatment for her alcoholism at age 16, what they told her to do if she got uptight was to smoke marihuana. That was just crazy, and she finally went into treatment after a suicide attempt that was almost successful a year later. Now fortunately she is doing OK, but she still feels pain.

Senator HUMPHREY. Well, this has been very interesting and useful, doctors. Thank you very much. I wish we had more time. We have another panel, and in fairness to them, I think we should conclude this panel. Thank you very much.

Our next panel is comprised of educators, and they are Dr. Mel Riddile, coordinator of substance abuse prevention in the Fairfax County public schools—that is Fairfax, Va.—and Dr. Marsha Keith Schuchard, who is an educator and the author of a well-known and highly respected publication, "Parents, Peers and Pot."

If you will pardon me for about a minute or two, I have to make an important phone call. I will recess the subcommittee for 3 minutes and be right back.

[Whereupon, a brief recess was taken.]

Senator HUMPHREY. The subcommittee will come to order, please.

Dr. Riddile and Dr. Schuchard, thank you for your patience, for waiting and for coming. Do you have an opening statement, Dr. Riddile?

Dr. RIDDILE. Yes.

Senator HUMPHREY. Proceed at your pleasure.

STATEMENT OF MEL J. RIDDILE, M.D., COORDINATOR OF SUBSTANCE ABUSE PREVENTION, FAIRFAX COUNTY PUBLIC SCHOOLS, FAIRFAX COUNTY, VA., REPRESENTING THE NATIONAL ASSOCIATION OF SECONDARY SCHOOL PRINCIPALS; AND MARSHA KEITH SCHUCHARD, PH. D., ASSOCIATE DIRECTOR, PRIDE, GEORGIA STATE UNIVERSITY

Dr. RIDDILE. Thank you.

First of all, I would like to express my appreciation for this opportunity to talk to you about this subject, and I know a lot of school administrators out there would like to have this opportunity because anybody who goes into education or is in a position where they must deal with young people quickly comes to the realization that in order to have a productive school climate—one that is characteristic of students who are motivated and who want to learn and where high achievement and morale is characteristic of that school—you must first deal with the drug problem.

You cannot in any way think that drugs will go away; that it is something that happens in other schools or in other jurisdictions. It is a problem we must confront in the schools, and I think we are trying, although I think part of the problem is that we are adults who have not had contact with the drug subculture; we did not grow up in a drug subculture. Therefore, we are less able to deal with the problem than we would like to be.

First of all, I would like to say that no level of marihuana use among young people is acceptable. In my observations and the observations of my colleagues, as drug use progresses the child or student begins to lose control of his life.

Dr. Macdonald cited the various stages of drug use. We generally are the last place to see the signs of drug use. It is very similar with respect to adults and their alcohol and drug use in terms of its effect on the workplace and the job. That is usually the last place to see the signs of alcohol abuse. I think the school is very similar in that we are the last place to see the signs of adolescent drug use, but we are often the first to identify the problem as drug use. The result of that is a lot of denial on the part of parents; they are blaming the school; the school is blaming the parents. The community agencies blame the schools for the problem, or blame the parents.

A big split occurs between the three most important groups in terms of preventing problems and dealing with the problems. So, it splits the adult community and creates a lot of anxiety and frustration among adults.

Drug use is probably the most damaging of all things to the school environment. It affects the individual in terms of poor performance. I will give you a list of observations that I have in terms of what it does to the individual.

We notice a loss of energy and drive; a general loss of interest in school activities; eventual social withdrawal and passivity; impaired learning ability. Students use the description, "Class was more interesting, but I do not remember anything that went on in class." There is a short attention span, poor memory, irritability, open defiance of school authorities, and repeated incidence of inappropriate behavior.

We see a very close connection between drug use and a lot of other negative behaviors—absenteeism, vandalism, verbal and physical assaults on teachers, and a whole variety of negative behaviors.

It also affects the classroom in a very adverse way. We find poor class participation. If you used the statistics that Dr. Pollin spoke of, you would have in a typical senior English class of 30 or more students, three daily marihuana users.

Now, first, I would like to say that we generally do not find daily marihuana users who reach their senior year, and they thus are not a part of his statistics. They generally do not make it to their senior year; they generally drop out of school before their senior year. In fact, the majority of students that we discover or have to deal with in terms of marihuana use in school begin their use in early junior high school years, probably seventh and eighth grade; rarely do they begin use after they reach high school.

I will just mention again that daily users rarely make it to their senior year. Anybody that does use marihuana on a daily basis is virtually unable to function at all in a school environment. The term "burn-out" was brought up, and I think it is a pretty accurate description, and that is the students' own description. A "burn-out" is a person who is unable to function and who has no emotion; they are unable to think for themselves and need a lot of assistance just to get around in life.

One of the effects that marihuana has on the classroom is that it distracts other students. Teachers are often unaware that a student is intoxicated or high. The other students, though, are aware; students can readily spot marihuana users. This presents a distraction in the sense that the other students are constantly watching the teacher and that student to see what the quality of interaction will be.

It also disrupts the classroom in terms of its distracting students. Often, students waver between passive mood states and aggressive mood states. In other words, you may describe it as an alcoholic who, one minute, is intoxicated and feeling good, and the next is having a hangover and is irritable and aggressive. I think we see a similar pattern.

Teachers often think that the reason students are behaving this way is that they have no motivation or that the class is not interesting or the instruction is not appropriate, so they attempt to change their instructional methods or content. This is to no avail if drug use continues, because no learning will take place when a student is in an intoxicated state. So, we find teachers becoming increasingly frustrated in trying to motivate students in their classrooms.

Probably the worst effect of marihuana use is on the school climate and the general school environment. First of all, it contributes to the formation of an alienated subculture in the school that wants to have nothing to do with anything that goes on in the school, but does want to have something to do with talking about, finding, purchasing, distributing and using drugs, particularly marihuana.

Marihuana is the No. 1 threat in terms of drugs used in the school environment because it is relatively inexpensive, it is easy to conceal, and it is hard to detect when a person is under the influence. So, it is particularly attractive to beginning drug users.

That alienated subculture often engages, as I mentioned, in a variety of negative behaviors. So, we try to treat the negative behaviors, and we are only treating the symptoms of the problem, when the real problem is drug use. Anytime a school activity is held or anytime an activity is planned, you must account for the fact that there may be some drug use, and plan to control or prevent any drug use.

It creates a division in the student body by creating separate peer cultures. A lot of antagonism results between different cliques in the student body.

As I mentioned, we find a very high rate of dropouts among drug-using students. In one school I worked, we found that we had a 28-percent dropout rate among that population; that is over 10 times higher than the rest of the student population.

It contributes to low staff morale. Teachers, administrators and counselors attempt to deal with the problems of students, and, again, they deal with symptoms of problems. They experience the same kind of guilt and frustration and anxiety that parents experience who have children that are abusing substances. So, in that sense, drug use is not only an individual disease and a family disease, but it is also a school disease, because everyone in that school feels those emotions and experiences the emotional pain.

We find teachers becoming increasingly frustrated and ready to give up in terms of trying to deal with these problems because no matter what we do, we find that the problems persist—unexplainable continuation of inappropriate behavior. It is difficult for us to comprehend a rational person continuing to misbehave in the way some of these students do, so it is very frustrating to deal with that.

Finally, we begin to lower our expectations, both about academic performance on the part of students and about their behavior. Students also lower their expectations about how they should behave. They begin to gage and compare their behavior to the worst behavior in the school.

For instance, they will say, "Why are you bothering me? Look at what they are doing. If you cannot deal effectively with that problem, why are you hassling me?" In a sense, they are right. If we cannot deal with the worst of misbehaviors, which I believe to be drug use, then we are really going to be somewhat ineffective in dealing with all the other behaviors. So, we have a generally declining quality of academic performance through the distractions and disruptions of the class environment and student behavior.

I think that the answer is that the groups that are often found pointing fingers at each other about the causes of these problems need to join very closely together, and I think one of the factors that is very encouraging to me is the parent movement, and particularly groups like the National Federation of Parents and other parent groups around the country.

As an administrator, I had to deal with problems in the school for years, and parents often thought, "Why is this person so opposed to drug use, and what is his motivation?" Now, parents are providing support to school administrators, so I think that there is some hope.

But I think we need to take caution in thinking that the problem is declining; it is definitely not declining. There is a flood of drug use in our society among young people. The flood waters have no sign of abating, and we have to do everything we can to prevent drug use and to work with parents, schools and community agencies to make them aware of the definitely different problems that adolescents experience when they are using drugs.

Thank you.

Senator HUMPHREY. Thank you.

[The prepared statement of Dr. Riddile and questions and answers follow:]

Statement by Dr. Mel J. Riddile, representing the National Association of Secondary School Principals before the U.S. Senate Subcommittee on Alcoholism and Drug Abuse. October 21, 1981.

I would like to take this opportunity to express my appreciation for this opportunity to speak to you regarding the disruptive effects that marijuana use can have on the education of our young people. My statements in reference to the detrimental effects of marijuana are based upon my own experiences as well as those of other educators who have dealt with hundreds of marijuana users over the last decade. Education is a profession that is concerned with the growth and development of this country's most vital resource, the minds and bodies of our young people.

The social, emotional, and intellectual development of these young people is being seriously impaired by the widespread use of a variety of licit and illicit substances, particularly marijuana. Drug use, because of its effect on both the individual and the entire school environment, undermines and works contrary to the goals of education. Today's teachers, counselors, and administrators must be prepared to deal effectively with young people who are harmfully involved with chemical substances, for learning and growth can not take place when a child is in a drugged state.

I will use the term drug use rather than drug abuse, because abuse automatically implies that some unknown level of drug use among young people is acceptable. Those who work with them on a daily basis know that as drug use escalates these young people progressively lose control of their use. The results are lowered aspirations and expectations, deteriorating interpersonal relationships, lost dreams, and possible death by auto accident or drug related suicide.

Of the long list of drugs currently used by young people marijuana, by far, poses the most serious threat to the school environment. Marijuana is particularly attractive to beginning drug users because it is comparatively low in cost, easily concealed, and difficult to detect. These factors combined with the increasing sophistication of young people in regard to the distribution and concealment of marijuana pose a difficult challenge to those school officals seeking to maintain a "drug free" school environment.

My discussion will focus on the three components of the school which are adversely affected by marijuana use; the individual, the classroom, and the school climate.

There has been a distinct trend in recent years in which young people have begun to experiment with marijuana and other drugs at earlier ages. The younger the child at the age of initial experimentation, the less they are able to control their use patterns, and the higher the probability that they will become harmfully involved. That is, that they will experience some problem or feel emotional or physical pain as a result of their use of a chemical substance.

The seventh, eighth, and ninth grades or ages twelve, thirteen, and fourteen is a critical period for young people in relation to the formation of attitudes about drug use and experimental or beginning drug use. A majority of the use problems encountered in a school environment involve students whose involvement with marijuana began prior to their entry into the ninth grade.

Job performance is usually the last area of in individual's life to be affected by adult drug use. Similarly, the school environment may be the last place to see the effects of drug use on the student. Initial experimentation generally does not take place in the school, but rather in a "party" or social situation. In a vast majority of the cases, parents have already observed noticeable changes in a child's behavior, although not necessarily attibuted to marijuana use, long before problems occurred at school. Often, when changes in behavior begin to appear, parents attribute them to the "growing pains" of adolescence. Thus, heavy marijuana use patterns may go undetected until very late and consequently are often very difficult to control and treat.

It must be pointed out that an important step is taken in the progression of a young person's drug use pattern when drugs are either brought into the school or the student arrives at school in an intoxicated state. In this case, the user has openly identified with the drug culture and may be using marijuana just to get through the day. By that time, drug use has generally progressed to a point where intensive treatment is required.

The effects of the introduction of marijuana into the life of a young person who is in a stage of rapid growth and who is developing physically, emotionally, socially and spiritually is declining academic performance, social withdrawl and eventual isolation, and physical and psychological deterioration. Rather than becoming more independent, adaptable people, these students become more dependent, and unsocialized as marijuana use escalates.

Students who begin to use marijuana on a regular basis show a distinct pattern of behavior in which they oscillate between a low energy, passive, withdrawn state and an openly defiant, anti-authoritorian, physically and verbally aggressive state. They lose interest in their education and school activities and become progressively preoccupied with obtaining and using marijuana.

Marijuana use and the accompanying cognitive impairment account for the fact that students are quickly frustrated and easily give up when engaged in complex tasks, particularly in subject areas which require learning new information and applying that information through higher level thought processes. Students indicate that their classes seem more stimulating when they are under the influence of marijuana, but admit that they retain very little of what takes place. In their own words, "things just go in one ear and out the other."

As students use more and more marijuana, they become less able to control their use, less able to evaluate their own behavior, and less willing to accept responsibility for their actions. Marijuana seems to delude students into believing that they can perform complex physical and intellectual tasks better when they use marijuana. They think they can drive an automobile better, study better, play music better, play football better, when, in fact, it is quite obvious to everyone around them that the quality and quantity of their performance is declining.

Marijuana use makes students less aware of their own behavior and how their behavior is perceived by others. For frequent marijuana users there exists a deficit in intrapersonal and interpersonal skills resulting in repeated instances of inappropriate behavior, which often leads to sanctions being applied by parents, school officials and even friends and classmates. They frequently perceive these sanctions as continued attempts to dominate and control their lives, and often resort to more drug use which is perceived by them to be one way that they control their own lives. The lack of awareness and skills to deal with these situations results in a growing feeling of persecution and noticeable paranoia.

Long-term use patterns result in high levels of anxiety and frustration, guilt over lost dreams and deteriorating relationships, and prolonged depression. The potency of today's marijuana compared to that of the mid and early 1970's combined with the increased frequency of use has caused us to change our definition of long-term use from that of years to months. Performance and behavioral problems resulting from marijuana use are appearing much earlier in the use pattern than was the case even a few years ago.

Adolescence is a time when young people learn to cope with emotional ups-and-downs of life. When marijuana is used in place of internally devised coping responses, the individual misses the opportunity to develop appropriate life skills. When faced with the painful feelings that often accompany frequent drug use, adolescents resort to the only coping behaviors that they have learned, more drug use. The result is an endless cycle of painful experiences followed by inappropriate coping behavior and more drug use.

Marijuana use has a particularly disruptive and undermining impact on the classroom environment. The extent and nature of its effect on the classroom is based primarily upon the chemically induced mood swing experienced by the individual. Any student who enters a classroom in an intoxicated state disrupts the classroom because of the distracting effect those students have on the other students in the class. While the teacher may be unaware of the student's marijuana use, other students are anxious to see how the teacher and the students interact or if the teacher notices that the student is in an intoxicated state. In this situation the students have "put something over" on the teacher. It may be readily apparent to others in the class that the student in question is high, but to a teacher with no experience or exposure to today's drug oriented subculture, the intoxication is not so apparent. The other students wonder why the teacher tolerates students coming to class high and begin to compare or gauge their own behavior to that of the most disruptive student in the class, the one who comes to class high.

Students in a passive socially withdrawn state mislead the teacher into believing that the subject is boring or too difficult or that the student simply does not care. These missed perceptions result in high levels of frustration in teachers who try new instructional approaches, revised course content, and other strategies that seek to motivate these students, but all are doomed to failure, for no learning will take place when a student is intoxicated. Teachers may begin to question their own ability or the ability of the students which may lead to lowered expectations for student performance. In this way, every child in the class is either directly affected by marijuana use through the teachers frustration and lowered expectations or the distraction posed the intoxicated student.

Student who are in the more aggressive, anti-authoritorian mood state openly disrupt the classroom by talking, laughing, and openly challenging the authority of the teacher. They help to create a "carnival atmosphere" in the classroom that makes learning for others difficult and often unlikely. In such cases the teacher spends a considerable amount of time disciplining students, and experiences extreme frustration because of the resultant loss of instructional time. Misbehavior is often attributed to causes other than drug use contributing to a widespread feeling that kids "aren't what they used to be." Thus, marijuana use impacts heavily upon the classroom setting affecting even those not directly involved including both teachers and students. The results are frustration and lowered expectations for student behavior and performance on the part of teachers, and distractions and disruption to student attention and concentration.

In addition to severely impairing individual performance and contributing to classroom disruption, marijuana use affects the entire climate of the school. The drug using subculture contributes to the formation of a divisive split within the student body by denying the attitudes and values of general student population and openly defying the authority and responsibility of school officials to maintain order and discipline. Their subculture is preoccupied with finding, buying, selling, and using drugs, denies the value of an education, and is often openly critical of "straight" behavior, which to them represents conscientious students who are actively involved in school activities.

This alienated peer culture offers immediate acceptance to any student willing to engage in drug use. The group grows in numbers by attracting any student having difficulty adjusting to the school. Students in this subculture are disproportionatly involved in such negative behaviors as truancy, absenteeism, vandalism, class disruption, verbal abuse of staff, and insubordination. These students monopolize the time of counselors and administrators who are trying to find some way of reaching and helping these students. But as long as marijuana use continues the additional supervision, counseling or tutoring will not help. Performance and behavior will continue to deteriorate. The result, the student may eventually drop out of school.

Dedicated staff, like well intentioned parents, think that they should be able to help each student, achieve success. They experience feelings of failure and guilt as a result of a student's continued inappropriate behavior and resultant failure. The truth is that there may be no appropriate educational programs for a student who is under the influence of marijuana.

Just as adolescent drug use is called a family disease because of its derisive affect on the family structure, so may it be called a school-wide disease because drug use serves to create a disruptive atmosphere and is associated with a wide-range of negative behaviors, and generally undermines the entire educational process affecting every student and staff member in the school. This situation contributes to parent-school conflict by encouraging blaming between parents and school staff and denial on the part of both the home and school regarding the source of student misconduct and failure.

Finally, the behavior of the entire student body may deteriorate as a result of the involvement of students with marijuana. Students begin to use the worst behavior in the school, possessing and using drugs, as a basis to which to compare their own behavior. Students begin to rationalize and minimize their own indiscretions by comparing them to the behaviors they consider to be the poorest in the school, and ask "why isn't something being done about that."

SUMMARY

Thus, marijuana use among the school-aged population has a negative affect on all facets of school life, the individual, the classroom and the climate and order of the entire school.

Marijuana's effects on the individual include loss of energy and drive, loss of interest, social withdrawl, passivity, impaired cognitive functioning, short attention span, poor memory, irritability, open defiance of school authorities, and repeated incidents of inappropriate behaviors.

Marijuana's effects on the classroom include poor classroom participation, distraction of other students, disruptive behavior, lowering of student's expectations of their own behavior, lowering of teacher expectations regarding student performance and behavior, and teacher frustration.

Marijuana's effects on school climate include the formation of an alienated student subculture whose attitudes and values are in conflict with the goals of the school, the division of the student body into separate peer cultures, increased absenteeism, vandalism, disruptive behavior, and school dropouts, lower staff morale, staff disengagement, and an overall lowering of expectations for performance and behavior of students.

Teachers, counselors, and adminstrators must recognize and prevent drug use by students or face the prospects of a progressive deterioration of student behavior. The school staff must deal effectively with the most negative student behavior or accept the fact that behavior may become a standard by which all other behavior is compared. But the school cannot be effective in preventing drug use by acting alone. Parents and the school staff must join together along with the entire community, to present a unified "no-drug" message to counter the many "pro-drug" messages that young people receive today.

Your testimony indicates that the result of marijuana use during adolescence is declining academic performance, social withdrawal, and eventual isolation. Earlier this year we heard testimony from some California high school students who indicated that in many cases not being a part of the drug culture subjects students to isolcation and ridicule by their peers. Non-users are not invited to social events, etc. Are there two separate communities in the schools, the drug v. non-drug? How do these communities interact?

A few years ago we did see two distinct groups in the school, those directly involved with drugs, and those either not involved with illicit drugs of occassional alcohol users. These were two distinct, polarized groups. Recently, the lines separating these groups have become less distinct. Students now describe the differences between the groups by citing when drugs are used, weekdays or weekends, instead of what drugs are used, alcohol or marijuana and harder drugs. Students who abstain completely from using drugs and alcohol are in a small minority. These students pose an implied threat to the drug using behavior of their peers and are often ostracized.

These groups seldom interact. Their value systems, goals, and interests are very different. The result is the existence to two distinct subcultures within the school.

From your vantage point in the school, what is your belief about the validity of the stepping stone theory that use of marijuana leads to use of other drugs?

From my own observation, their is a high positive correlation between the increasing frequency of marijuana use and the individuals use of harder drugs. That is the longer and more frequently individuals use marijuana, the higher the probability that they will at least experiment with harder drugs.

How are teachers being trained in the schools to notice students exhibiting drugged behavior, and what methods are used to deal with it?

Teachers need not be experts on drugs but rather experts on young people. By doing what they do best, teaching young people, they are helping in the prevention effort. Despite the best efforts of parents and teachers, these young people may get involved with drugs. Therefore, our training programs are designed to achieve earlier intervention with drug users through recognition of physical signs of drug use and the behavioral manifestations of chemical dependency.

Schools should have clearly defined policies which indicate the consequences of drug use. These consequences should be accompanied by mechanisms designed to encourage the student to be evaluated at a local treatment agency. All means at the disposal of the school should be used to help the student seek and obtain appropriate treatment.

You mention that students sometimes exhibit aggressive behaviors while "high." Could you elaborate on how these behaviors manifest themselves?

By aggressive behavior I am referring to verbal abuse, open defiance, and direct insubordination directed toward teachers and other staff members.

Do you believe marijuana use has contributed to the problems with lowered scores on college entrance examinations and the need for remedial courses for students entering colleges?

Marijuana use certainly has not helped academic achievement. It would be very difficult to determine the extent of damage done to the motivation and performance of our students resulting from marijuana use. My own feeling is that marijuana use has been a contributing factor in declining academic performance of certain students.

Senator **HUMPHREY**. Dr. Schuchard? How do you say that? How do you pronounce the name?

Dr. **SCHUCHARD**. Schuchard. You officially mispronounced it.

Senator **HUMPHREY**. OK, thank you.

Dr. **SCHUCHARD**. This educational hearing has provided a very exciting day for me, because I first got involved in trying to learn about drugs in 1976. At that time, finding the most minimal biological information about marihuana took weeks of working at medical libraries. This amateur "research" was carried out by mothers, by English teachers, and by people in our neighborhood, who refused to accept the diagnosis given by the majority of professionals that marihuana was a harmless substance, and that we should allow our seventh graders to smoke it. That is the position we were in at that time. Thus, this hearing's thorough examination of the health risks and the developmental risks makes me believe that 4 years of hard work in our community and, certainly, what people are doing here in Washington and elsewhere is paying off.

However, I do not think it is paying off yet the way Dr. Pollin perceives, because of the tremendous problem of dropouts and of heavy-using children in the 9th and 10th grades. At age 15 one finds the highest rate for daily usage of alcohol and marihuana among students in high school. Quite often, they really cannot cope and drop out, or their parents put them in private schools or military schools—anything to try to get some control over their problem. So, we applaud a small percentage decline, but we do not think it is significant enough to get the kind of publicity it is getting. In editorials all over the country, one reads that drug use is going down. We have worked too hard to get parents alerted to the fact that it is still a majority phenomenon.

What I would like to try to cover quickly are some practical methods that we have found that do work. I would like to finish up this hearing on a positive note. The essential ingredient is to get out to the public the kind of information given today about the biological and health issues involved. This should never be a political issue of liberals versus conservatives, or Republicans versus Democrats, or teetotalers versus martini drinkers. It is essentially an issue of the protection of juveniles during an extremely vulnerable period of development. We are steadily learning that this means the protection of reproductive function in young adults, also. I think we are going to have a lot of problems with adults who are heavy, long-term users. But, certainly, the primary focus, upon which we can all agree, should be on children who are still learning, developing, growing, and going through metabolic changes.

A sound educational campaign throughout the Nation on the biological effects of these drugs is an approach that can unite us, despite many differences of lifestyle, behavior or political and religious beliefs. Getting that updated health information out is the major effort that government, TV, newspapers and our budding underground press of PTA mothers should be involved in. (We mothers have plagiarized more articles and used more mimeograph machines at schools than probably any other populist movement in American history).

Given a credible, agreed-upon definition of the health hazards, the next step is to alert parents to the fact that they can have a tremendous positive influence on the drug problem. We do not need to make parents feel guilty or examine whether they potty-trained right or carpooled correctly—all the kinds of guilt-trip approaches that seem to go on endlessly. What we need to do is bolster their confidence that they are the most important people to their children in the world. Despite adolescent whining, sulking, door-slamming and threats to run away, teenagers want their parents to be in charge. It is an inarticulate yearning that their parents make clear where they stand, that they are there, and that they are in charge of their families. It is very tough to grow up in a world of confused or absent adults.

Another step is to recognize this as a mass peer phenomenon, reinforced by the popular culture which still saturates the children daily with "drugs are fun" messages. Those messages are coming everyday, in Visine ads in Seventeen magazine which are directed toward juvenile pot smokers, in the overt drug comic books, in Cheech and Chong movies which are playing on HBO in people's homes right now. The children are getting the "do drugs" messages every day. But, we feel that if parents can get the biological information to know confidently that it is their right and responsibility to protect their children's health, they do not need to argue about marihuana, anymore than they do about vaccinations and measles shots.

There are also practical steps they can take to change the peer culture that immediately surrounds their children. This is the nitty-gritty, very practical mechanism of the parent network. When your child says, "Everybody does it," or "Everybody else gets to do so-and-so," in effect they are dividing and conquering the parents in the community. They are isolating their parents into insecurity, confusion, and anxiety—"Am I really such a bad parent?" But parents must recognize that a peer group is really only 3, 5 or 10 kids, and that an adolescent measures his normality in accordance with how he fits in with those kids. It is an intense insecurity that is biologically natural. The only way to get rid of it is to abolish puberty which, unfortunately, is going to be impossible to do.

But parents can build up more of a consistent sense of a healthy normality for their adolescents by developing a working agreement with the other parents who are raising that gang of friends who "goof off" together and "hang around" together. The parents define the essential areas of behavioral rules that they will all enforce consistently. This does not have to mean many rules, but it should be the crucial areas of danger. Those are premature drug and alcohol usage; very precocious sexual activity, which unfortunately parents sometimes foster by pushing their children into a very sophisticated, party-going life; and other kinds of attitudes about rule-breaking, honesty, cheating in school, et cetera.

Parents must recognize that, with all of their differences, and even if they do not like each other as parents, their children are important influences on each other's lives. Thus, they should stick together on essential issues. What this mainly means is defining age-appropriate curfews and social gatherings for example, whether children in the eighth grade should be dropped off at rock concerts; whether seventh graders should cruise the shopping malls, particularly when head shops and drug dealers proliferate in them, as they do in many communities, whether ninth graders should stay out past midnight.

It is so simple and so ordinary that we are reinventing the wheel. This is the way most of us were raised, with some sense of adult networks of communication that often boiled down to just the old snoop in the neighborhood who called your mother before you could get into very much trouble. But, it does not have to be just an old snoop in the neighborhood. It can be a kind of committed, alerted effort by parents, who band together in small enough groups to be practical. Working in clusters, they can counter the waves of cultural pressures coming on the children from TV, radio, and movies. By providing clear rules and consequences at home they can counter the constant sense that nobody pays legal consequences for drug use, which children see everyday in the newspaper and on the nightly news—the stars, the politicians, the musicians, and the athletes who get caught on cocaine or marihuana or even more serious charges, and nothing is done about it. For teenagers, that is an unraveling message that there is no control out there and "there are no consequences to my actions."

Now, the parent network or parent peer group can be a lot of fun too, and we find that it is a tremendous antidote to the fragmentation of families. We must begin to face the disturbing fact that we have looming ahead of us the first generation of American children who will be entering adolescence in a few years, in which the majority have only one parent or maybe no parent home for most of their growing-up experience. These are the "latch key" children who, in many schools, are 50 to 60 percent of the enrollment in the second grade right now. We are going to have to build a kind of artificially extended family out of the bits and pieces of families that are out there. Or, we are going to have a teenage generation on our hands 4 or 5 years down the line that will be the most inadequately parented of almost any group we have ever tried to bring through adolescence into adulthood.

We have found in parent peer groups and parent networks that single parents benefit tremendously from having other mothers and fathers helping to raise their children and from baving their children feel like they are part of a group of five or ten families, who may be fragmented or intact families.

But the most important point is that this works. An adolescent's measurement of what is expected or normal or attractive behavior becomes localized within a group of children and families small enough to comprehend and to manage. We see this small parent network as the antidote to the tremendous cultural pressures that come in a mass, anonymous way exhorting children to "party" and "get high" all the time. Certainly, we parent groups hope we will not have to go on being little islands fending off the cultural tide forever. But, even when the drug culture is in full flood in a community, small groups of parents really can prevent or stop their children from using drugs.

But, none of us wants to have our fingers in the dyke always. Instead, we must rebuild the protective dyke and stop the flood. Parent organizations must support actively their local school, which is where the children are for most of the day, in everything the school requires to make it harder to do drugs and to make it less attractive and less acceptable.

We have seen many success stories over the last 3 years when parents build strong support for schools. There are many schools that have turned around the drug situation, particularly in Georgia and Florida because parent groups have been at it a little bit longer there. I will give a brief case history of such a school in Atlanta.

This is Northside High School, a big public high school with 50-50 black-white enrollment, a big busing program, 33 religions, and an income range from dire poverty for whites and blacks to extreme wealth for whites and blacks. It is a good, old style, melting-pot American public school. A few years ago, in fact, it was called "Fantasy Island" by its critics, it was pretty much of a disaster.

What Northside has achieved is a strong parent organization, a PTA task force on drugs, increasing cooperation with physicians, increasing involvement with the police force and the juvenile court, an updated drug curriculum, and a new behavioral code with very tough rules. The principal and faculty continually affirm to parents and children about how important it is that students have high expectations for themselves and that they recognize that hard work gets you where you want to go if you have such expectations.

What they have built up is a multileveled approach to the drug problem, mainly based on parent awareness, parent networking, et cetera. But the school tightened up its rules and, most importantly, enforces them down the line. This means detention hall for tardiness if your toenail is in the hall and you are late for class; it means volunteer mothers calling about every child who is absent from school to make sure they are where they're supposed to be. The process includes teacher workshops to update the faculty on drug and alcohol use and what symptoms to look for.

Also, there has been the envaluable participation of doctors in the community who have become knowledgeable and whose names are listed as being alerted about drugs. They are willing to give physical examinations and to do drug screens through urine testing, and then help the family deal with the diagnosis. Now, everyone believes the pediatricians. When they talk to a young person and talk to the family about drug use, they place the problem within the realm of an objective health diagnosis. In Atlanta, we have tried to build up a process in which the pediatrician or the physician can then recommend that the parents get into a parent peer group, if the child's drug use is mainly a peer-influenced behavioral problem. If it seems to be a problem needing psychiatric counseling, which we estimate is only about one out of ten abusers, then the principal or physician recommends evaluated psychiatrists, who do not believe in giving drugs to kids and who aim at drug-free behavior. Then there are support groups for the parents and the children, whether it is Alcoholics Anonymous, Nar Anon, Alateen, et cetera—some kind of group out there to help the young person stay "straight" and to have a group of peers who will share a commitment to a drug-free lifestyle.

What Northside High School got out of this process was a wide range of improved statistics and behavior. Tardiness, which was averaging 5,000 a day, went down to about 30 a day. The truancy rates have dropped by about 80 percent. Eighty-five percent of the student body—and this is a multiracial, multiclass high school—takes far over the minimum graduation requirements. Voluntary enrollments in physics, advanced math, and foreign languages have risen so much that they are recruiting for teachers.

All of the traditional activities of an American public school have come back—homecoming, float-building, involvement in clubs, et cetera. As Principal Bill Rudolph concludes, "The drug issue is what we were able to mobilize our parents and our community around, as the most obvious threat to our children." But to get subh mobilization, it took a tough-minded, honest principal who said publicly, "It is as bad as you think and worse," rather than being concerned about the image of the school. But, the commitment to change a bad situation was based on solid drug education for parents and children, and then the strict rules to back it up and prove the community's seriousness.

I'd like to add one more thing. I think the message to teenagers that adults are afraid to enforce the law is the most confusing message we can give them. Nearly every high school we have seen that has turned the situation around calls in the police for illegal drug offenses. But, they also try to have a good working relationship with the juvenile court, so that there is a constructive game plan to help the young offenders and their parents. Many, many kids say, "That arrest saved my life. If only it could have happened earlier."

To make law enforcement meaningful, the constructive element is critical. Incarceration is not particularly the main point, but rather to get the young offender into some kind of a monitored abstinence, perhaps with a physician who will use drug screens to make sure he gets clean of the drugs. The court can also get the parents and juvenile into some kind of a peer support group.

We have found that in most of the schools in Georgia and Florida, which, have been working on this for 3 years now, the kids begin to respect the law because the law means something. It is a way of definitely saying that the drug-using behavior is not to be tolerated, and it is also a way of mandating help for someone out there who needs it. I think our country needs to reexamine this issue more seriously—that is, whether we have the courage to use the drug laws to really help people.

Thank you.

[Prepared statement of Dr. Schuchard follows:]

HOW THE FEDERAL GOVERNMENT CAN BETTER SERVE THE PARENTS' MOVEMENT FOR DRUG FREE YOUTH

Statement to Subcommittee on Drug
and Alcohol Abuse, October 21, 1981.
Marsha Keith Schuchard, Ph.D.
--Author Parents, Peers, and Pot
--Associate Director, PRIDE
Georgia State University

I am pleased and encouraged by the active role that Senator Humphrey and the Subcommittee hope to play in reducing drug and alcohol abuse among American youth. As a parent who unexpectedly became a do-it-yourself drug "expert," I urge the Committee to help design and implement a massive public educational campaign on the health hazards of marijuana and on the implications for our society if the epidemic continues. As a consultant to hundreds of parent groups which are springing up around the country, I pledge the support of thousands, perhaps even millions, of parents to a national campaign for drug free youth--a campaign that must reach from the White House to the neighborhood level.

To emphasize the urgent necessity of such an extensive educational project, I would like to briefly review the history of the commercialized drug culture during the past five years and the subsequent development of the parents' movement against drugs. In 1977 in a Canadian journal, Dr. Robert DuPont, then director of the National Institute on Drug Abuse, voiced his growing concern about the expansion of marijuana use among American youth. He was especially puzzled at the apparent ignorance and apathy about the epidemic among leaders in the public health fields, governmental policy-making, and the intellectual world. Under a headline reading "Global Silence Reigns on Cannabis," DuPont noted:

> Almost the entire world is going through a very fantastic change with respect to cannabis consumption, but almost nothing is being done about trying to understand the phenomenon or deal with it. It seems to me that the smart people and the powerful people in the world are literally turning in the other direction and saying nothing about what the policy implications should be or anything else. It's as if we've all joined a conspiracy of silence on the subject. I think it is very scarey.

Significantly, the "conspiracy of silence" meant that DuPont's important warnings were never published in the U.S. press. Moreover, despite a Congressional mandate that HEW publish an annual "Marijuana and Health" report, no update on research was published by that federal agency for over three years (from 1977 to 1979).

This informational vacuum was rapidly filled by "do drugs" messages of the commercialized drug culture. The joys of "getting high" were extolled more and more blatantly in music, movies, and T.V. shows, until a majority of American teenagers came to believe that "partying"--that is, a "normal" social life of friends and fun--was synonymous with drug intoxication. The mushrooming growth of the paraphernalia industry, with its pro-drug comic books, toys, and tee-shirts, sent a clear message to pre-teens that drugs are "fun and games." While federal agencies and the media focused their efforts on "hard drugs," the pivotal role of marijuana as the gateway into the drug culture was virtually ignored. Young people received few credible messages about saying "No" to marijuana, which was especially tragic because youngsters who say "No" to pot say "No" to the whole drug mentality. All surveys agree that if young people do not smoke pot, they do not use any other illegal drugs.

Meanwhile, for the millions of parents who were struggling with their drug-changed children in their own homes--who were seeing with their own eyes the gradual deterioration of emotional and physical health in their pot-smoking "partiers"--the apparent "conspiracy of silence" became a source of increasing confusion, frustration, and bitterness. Eventually, many of these worried parents began to do their own research, to read the latest medical studies, and to develope their own educational materials on the health hazards of marijuana. Working out of their kitchens and utilizing P.T.A. mimeograph machines, they began to reach out to other parents--hoping to alert and mobilize them to counter the power of the drug culture, to spread the information about marijuana's health hazards, and to join together in parent peer groups to reverse the pro-drug peer pressure on their children.

As these do-it-yourself drug educators took their messages to P.T.A. meetings, neighborhood gatherings, civic associations, churches, and school boards, they often ran into surprising opposition: from psychiatrists who dismissed drugs as trivial matters and proceeded to psychoanalyze the "guilty" parents; from tax-supported drug abuse professionals who smoked pot themselves and condoned its usage by their juvenile clients; from school administrators who feared that exposure of the epidemic would hurt the "image" of their school; from the media which assumed automatically that parents concerned about marijuana were puritanical reactionaries.

However, by starting at the grassroots level, by reducing the drug problem to a manageable scale of three to thirty families, and by providing sound medical information and practical advice for shared supervision and limit-setting, the parent groups were seen able to demonstrate that they could effectively change the intoxication-oriented social life and reclaim the local teen culture from the drug culture. Within three years, the parents' movement for drug free youth had grown from two groups in Georgia to over a thousand nationwide.

But, each of these groups feels that they are in an uphill struggle, given the massive dimensions of the drug trafficking network, and they are frustrated by the lack of a clearly articulated, well-publicized drug policy at top governmental levels. Many parents wonder why the President, who has strong anti-drug convictions, does not speak out more on the issue--especially when drug-impairment is directly related to the issues of falling productivity and military weakness which are top Administration concerns. The parents often wonder why the scientific expertise and superb communication ability of Dr. Carlton Turner, the President's senior advisor on drugs, is not utilized more publicly for national educational efforts. They wonder why the C.D.C., the National Cancer Institute, and the National Institutes of Health are not involved in any serious epidemiological investigation of the connection of marijuana with reproductive difficulties, lung damage, susceptibility to disease, pre-cancerous cell changes, and deficient pubertal development in adolescents.

Having witnessed at first hand the damage marijuana causes to the individual abuser--frequently their own child--these parents wonder why no one at the top levels of government seems to be taking the broader public health implications seriously. If the marijuana epidemic among our children were a chicken pox epidemic, our health agencies would be mandated into action. This sense of policy drift and informational vacuum at the federal level is especially frustrating because these parent groups have learned that they can make a real difference at the local level. They know that a clear and strict local policy--in the home, schools, and courts--coupled with up-dated biological information about drugs are the key elements in changing youthful attitudes and behavior. What these grassroots efforts need, however, is much stronger reinforcement from the top levels of government and from the national media.

I would thus like to suggest the steps that we parents see as necessary to building a credible and effective national policy--one that is non-partisan and non-sectarian in its aims and methods. For, certainly, the marijuana issue should never have been politicized; it is essentially a matter of public health and the protection of vulnerable juveniles.

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1) A public educational campaign should be mounted that focuses on the biological effects of marijuana and other drugs.

   The Surgeon General's Report, the statements of the Secretary of HHS, and both private and public health agencies should be utilized. The essential facts of chemical complexity, fat solubility, cumulative effects and increasing potency in marijuana should become as much a part of the national consciousness as nicotine in tobacco and ethanol in whiskey. The special vulnerability of the growing child and adolescent, the female, and the fetus should be stressed, with particular emphasis on hormonal and reproductive risks, lung damage, and neurological impairment.

2) This biological information should be targeted towards various groups who have significant influences on young people:

   --PARENTS: who can maintain clear and firm anti-drug rules in their families, based on the right and responsibility of parents to protect their children's health. Parents can also use the biological information as a counter-argument to the merchandizers of drugs, and work towards the elimination of "do drugs" messages in the media and local shopping areas. Parents can link up in parent peer groups or networks to provide more consistent supervision and guidance to their child's circle of friends. These three elements--sound health information, reduction of pro-drug cultural messages, and parent networking have proven effective all over the country in reducing consumer demand and reversing peer pressure.

In a time of declining federal revenues, the utilization of tax dollars for prevention and education should be aimed at maximizing the numbers of parents reached by good information and practical advice. A portion of the block grants to the States should be earmarked for regional conferences in each state that will train parents to go back to their own neighborhoods and reach out to more parents. Such small amounts of public seed money and technical assistance often generate matching funds from private sources for community educational forums.

--EDUCATORS: who can up-date their curricula, re-stock their libraries, and maintain strict rules against drug use at school. The neurological impairment and diminished energy associated with marijuana use is a sound basis for anti-drug educational policy and strict enforcement of rules.

--PHYSICIANS: who can up-date their clinical knowledge and carry out the urgently needed diagnostic detective work that will define the full dimensions of the public health problem. The new urine tests for marijuana and other drugs can be used with routine physical examinations as a valuable diagnostic and counseling tool. Because of their high credibility with young people and parents, physicians can play an important role in changing attitudes and behavior because of defined health risks.

--BUSINESS AND INDUSTRIAL LEADERS: who can educate their employees about the lingering and cumulative effects of marijuana which can decrease productivity and safety in the workplace. Strict company policies can be credibly based on education about drug effects on coordination, alertness, concentration, memory, and energy. High technology projects, such as nuclear power plants, transportation manufacturers, and electronics industries, are already experiencing enough drug abuse problems to pose a threat to public safety. The impact of marijuana on inflation, on dollar drain from the country, and on corrupt business practices should also be addressed.

--MILITARY LEADERS: who can inform their servicemen and women of the diminished physical strength and mental alertness, which reduce combat and technological effectiveness. With a sound educational program on the physiological effects of marijuana and other drugs, the military can maintain credibility and a sense of fairness for a program of routine drug screening and intervention. National security demands such serious measures.

3) A complementary public campaign should be mounted to educate the public about the complex realities of international and

domestic law concerning marijuana and other drugs.

This is a crucial step towards re-building public respect for the drug laws.

--Citizens should be made aware of our international treaty obligations, such as the United Nations Single Convention on Narcotic Drugs, which require that cannabis products be kept illegal, except for medical research purposes. The anti-cannabis attitudes of the many foreign countries with long experience of the drug should be stressed, as well as the interrelatedness of heroin, cocaine, and marijuana in international control efforts. The widespread misconceptions among the American public that equate decriminalization with legalization have been a boon to the drug culture.

--A clear policy, articulated at the highest federal levels, on crop eradication projects--as mandated by international law--would prevent another ill-informed paraquat flap.

--A clear public health policy which includes education, counseling, and voluntary support groups for abstinence would build public support for strict enforcement of the drug laws. The widespread failure to arrest public marijuana smokers is a major instigator of adolescent usage. The courts can utilize a drug arrest to play a constructive role in education and intervention, without having to resort to disproportionate punishment or nonproductive incarceration of naive users. Criminal traffickers should receive swift, mandated sentences.

4) Top federal officials and representatives of the medical profession should meet with national media representatives to enlist their support for a national educational campaign.

--A series of educational seminars for newspaper and newsmagazine editors, T.V. programmers, radio producers, and movie executives would undoubtedly generate more self-discipline and responsibility concerning the drug issue among these popular opinion makers.

--By focusing on the biological effects on vulnerable juveniles, both liberal and conservative media spokesmen could present a unified front on the public health issues involved.

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In summary, the parents' movement for drug free youth grew out of the growing sense of frustration and fear that our society was ignorantly and carelessly drifting into a massive biological experiment, in which the guinea pigs were our own happy-go-lucky, innocent children. The proven energy and effectiveness of the parents' movement is built on the universal instinct of parents to protect their young. However, the threat must first be recognized before these instincts are aroused into committed action. Thus, we pledge ourselves to keep working at home, in our neighborhoods, and with our schools to reclaim our children's social "norm" from the drug culture. But, we call upon our national leaders to address the drug threat in public statements, in serious programs, and with a clearer sense of governmental direction. If leadership at the top can merge with hard work at the grassroots level, then I believe this country will indeed reverse the drug cultural tide that has engulfed so many youthful victims.

Senator HUMPHREY. Thank you, Dr. Schuchard.

Dr. Riddile, you stated that the heaviest daily users never reach the senior class in high school, and therefore the statistics on the use of marihuana by seniors might well be misleading. Is that correct?

Dr. RIDDILE. That is correct. Most of the heavy users began prior to their entering high school, which would give them, by their senior year, 3 or 4 to 5 years of heavy use. When we define long-term use now, we are talking about months, not years. Because of the potency of the marihuana, we are seeing behavioral signs much quicker—maybe in 4 to 6 weeks. We were not seeing those kinds of behavior problems before—a decline in motivation, for instance.

Senator HUMPHREY. What was the term you used, a flood of drug abuse, or something like that?

Dr. RIDDILE. I said there was a flood of drugs; they are certainly available. Ninety percent of the students say that marihuana is easy to get; it is almost as easy to get as alcohol. In fact, I have seen students arguing about what was easier to get, alcohol or marihuana. The availability certainly presents a tremendous problem to parents and schools, and if there is any way that we can do anything to cut down on that availability, it would certainly help.

As I said, it is inexpensive, and junior high students are able to afford, by pooling their resources, enough marihuana to keep them supplied for quite a while.

Senator HUMPHREY. You see no improvement, then, from your position, in the use of drugs?

Dr. RIDDILE. Well, the improvement I see is in terms of parents and adults becoming more aware and intervening earlier. The frightening thing to me is that the children are so young when they are beginning use. That is the trend that we are seeing.

We are having to do a lot of work with elementary teachers and principals because they are starting to see signs of use there. I said that the school may be the last place to see it. Referring to Dr. Macdonald's statement, when we see a student bring drugs to school or come to school in a high or intoxicated state, they are at a stage where they are preoccupied with drug use, where they are openly identifying with the drug subculture, and where they definitely need treatment if they are apprehended. There is no question about that.

Senator HUMPHREY. At what grade does the availability of drugs begin to show up?

Dr. RIDDILE. What grade?

Senator HUMPHREY. Yes; you spoke about elementary school.

Dr. RIDDILE. Well, we had a very successful program in a high school and we concentrated our efforts on ninth grade students. We found that that was a critical year. If you look at juvenile crime statistics and if you look at a whole variety of statistics, that freshman year seems to be a critical year for young people, and we concentrated our efforts on that age group.

Senator HUMPHREY. I see. How does the presence of drugs and the use of drugs in high school affect the classroom from the point of view of students who do not use drugs?

Dr. RIDDILE. Well, it is certainly a distraction.

Senator HUMPHREY. Are they being cheated? Is the quality of their education being diminished?

Dr. RIDDILE. To the extent that the classroom is disrupted, yes. I know students have told me that they are often distracted by students who come to class high.

Senator HUMPHREY. Well, at least in your school system, how serious is it from the point of view of nonusing students?

Dr. RIDDILE. I would say that it is probably no better and no worse than any other area in the country, which is totally unacceptable. As I say, a small percentage of drug use takes place in school.

When I left a school to take a countywide position, I was trying to encourage a parent group to form in that school. The parents said, "Well, you have done such a good job at that school that we cannot get interest in the community because they think there is no drug problem." I explained to her that the majority of drug use takes place out of the school environment. As I said, when a child brings drugs to school, that is a big step in terms of their progression down. "Going Way Down" is the title of a book, but in terms of their progression and deterioration, it is a big step.

So, we do not see all the drug use that takes place; we may only see 10 percent. Most of it takes place after school on Friday and Saturday nights.

Senator HUMPHREY. What has the Fairfax County public school system done and what has your office done to attack this problem? What can someone do; what can a school administrator or teacher do, practically speaking?

Dr. RIDDILE. The first thing to do is to inform all adults; that includes parents, counselors, teachers, and administrators. I do not think anybody can be too well informed on this subject. We need to motivate those people to do something and to recognize signs and intervene when people are having problems.

Senator HUMPHREY. What do you mean by "intervene?"

Dr. RIDDILE. Well, empower people to the extent that they know that there is something that can be done; it is not a hopeless situation. We try to educate them about the signs of use and abuse—declining performance, lethargy, passivity, and those types of behavior—and let parents and counselors know, and communicate between adults about what is happening with that youngster.

Also, as Dr. Schuchard talked about, schools must develop an overall, comprehensive plan for that school to deal with the problem. So, we have developed and are developing teams consisting of administrators, counselors, teachers and parents who will devise plans and develop approaches to deal with the problems in their own schools.

Senator HUMPHREY. Well, we are still skating around the edge here, it seems to me. In practical terms, what plans can be developed? What can a school do, or a teacher or administrator? You have suggested that they act, perhaps, as an early warning system to advise parents and counselors of suspicious symptoms, but what else can be done?

Dr. RIDDILE. Well, first of all, the teachers must know that the administration will back them up and will deal in a strict manner with any drug problem; that there will be clear, specific policies and guidelines, and students will be informed of those policies and guidelines and about what the consequences of bringing drugs to school or coming to school intoxicated are. And these must be followed up.

It is important for these young people to know that there are rules and that people are willing to follow through with consequences if they break those rules. That is vitally important.

You almost have to get to the point where you assume that there are drugs in the environment, and actively seek to find where they are. It is a sad commentary, but that is a fact, and I think it is an attitude change that has to take place, and not a problem of denial between parents or schools. We have to accept the fact that this society has a high incidence of drug use among adolescents and that we have to do everything we can to deal with it. That issue of policy is very important.

Senator HUMPHREY. Yes, visible rules by which the students have to live.

Dr. RIDDILE. That is right.

Senator HUMPHREY. Do you have programs of drug education? Are you involved in that at all with the students?

Dr. RIDDILE. We are finding that students generally make their decisions about drug use in grades 7 and 8, and we have to begin prevention, if we are talking about primary prevention, before grades 7 and 8. So, we are revising our curriculum to concentrate drug education heavily in the elementary years with drug use.

We find that the most effective approach is to provide accurate information, combined with decisionmaking and problem-solving skill development exercises. Just providing information is not effective, and just doing problem-solving and decisionmaking exercises is not effective. They have to be done together. So, we are really out to concentrate our educational efforts with elementary students.

Senator HUMPHREY. Dr. Schuchard, how does a parent go about organizing a parent group if there is not one in his community?

Dr. SCHUCHARD. That is an important question because the idea of forming a parent group can be intimidating to parents. But we really want ordinary people to do this; we are calling upon ordinary mothers and fathers to get busy on this issue. A parent group can be three mothers gossiping in a carpool, or talking on the telephone; or it can become more organized and be all the sixth grade parents or a communitywide action group.

But the critical thing, is for the parents to recognize that the drug culture is here, to learn the lingo, to learn the signs of the culture, and to start realizing what is going on in the music, the movies, and the rock concerts. This is very important for gaining credibility with their own children. Parents look so square when they have no idea that the song playing on the car radio is all about cocaine, or that the "bongs" in the den are not for flowers.

The next thing is for the parents to make a kind of mutual commitment to stay in touch with each other. Dr. Macdonald said that we do not just allow our 3-year-old to toddle down the street. We have to think in the same way of the vulnerabilities of adolescents to the dangers which are out there right now. This communication network can be achieved through parents making it a rule of thumb to get to know the 4 or 5 parents of their child's best friends, and get together for a coffee. I think some of the best prevention work in the country is being done right now in "coffees" in people's homes, and this is going on in every State in the Union.

But parents should try to expand their educational effort so that little island of five children is not alone in a drug cultural tide. By developing built-in PTA programs for all parents of fifth and sixth graders, with a very sound education on "getting ready for adolescence" very strong and effective preventive measures can be maintained into high school. We think it is important for parents to think ahead about cars. Are they really a "Constitutional Right" for kids? It is a very strong incentive for keeping a clean record on drugs and drinking to know in seventh grade that infractions may mean "no wheels" at 16. It is a carrot and a stick approach, but it is the way adolescents are best raised.

The important thing is for children to see their parents taking a stand and maybe even embarrassing them to death by going public with it—about something they believe strongly. Parents must get over their timidity and realize that drugs are a serious threat to their children. Drugs are not an issue to become intimidated over when the kids do not like your rule or when they say, "Well, everyone else has kegs at their parties," or "Johnny's parents smoke pot with him; they are not old fogies like you are." The importance of parental firmness is why we really stress this whole health issue, because I think it is one we can mobilize parents around.

To get information on how to organize, it's best to contact people who have already done it. A lot of the different groups have manuals and brochures. You can write off for "Here's How We Did It in Omaha," or "Here Is How We Did It in Garden City, N.Y." Parents can find out which were the practical organizational methods that worked best. We think the highest priority target should be the fifth and sixth grade group of parents and children.

For example, I just spoke to 200 eighth graders in a little town in upstate New York. I gave them the whole biological picture of what marihuana does to the body. There were a lot of boys with all the symptoms, showing the deficiencies of pubertal development. They all recognized the physique as soon as I described it. Then I asked, "When should this kind of information be given to kids?" And they all said, "For sure by fifth grade." Then one of these kids, who already showed the visible symptoms of pot use, said that it better be done by second grade because it's too late for some kids by fifth grade. Now, these are children that the teachers think get marihuana in the home from parents who use it or older brothers and sisters. Thus, no time is too early to begin drug education, but the critical age is right before the peer pressure accelerates into a very intense kind of thing, right before adolescence.

Senator HUMPHREY. Well, you and a number of other witnesses seem to be suggesting that parents ought to consider embracing once again a more authoritarian style, perhaps, or a more old-fashioned sense of responsibility. I am not a psychologist, but it seems to have become fashionable to turn your youngsters loose at an earlier age if you are really enlightened and with it. You and others seem to be suggesting that you should hang on and indeed provide some very clear and enforced standards right into high school years. Is that a fair statement?

Dr. SCHUCHARD. Yes, I think so. I think "authoritarian" has such negative connotations, though, on the other hand, we probably have to think in these terms because the fashion has been the other way for a good while.

Senator HUMPHREY. Yes.

Dr. SCHUCHARD. I think we went through a noble experiment to see if parents could be adolescents and adolescents could be adults, and we ended up with a mess on our hands.

Senator HUMPHREY. Yes.

Dr. SCHUCHARD. The main thing is to measure this parental firmness in adolescence in terms of the independence you eventually want for your children. You watch the kids who are making it, who are becoming adults and leaving home who are not coming back to live with mother as a 28-year-old burn-out, which we are seeing more of. You interview the kids who stayed straight or got off drugs; they see themselves as more mature and independent and more ready to make a real life for themselves. I think it is very important to articulate this to the children. "Yes, we are willing to be strict about certain things now, because we want you to grow up and leave home. We do not want you damaging yourself in the meantime." That eventual independence is an attractive thing, even though teenagers will never make it easy.

Senator HUMPHREY. Yes.

Dr. SCHUCHARD. But the parents need that bolstering of confidence that what they are doing is right and sound and that it will work. I think this is very important; it is not a hopeless situation.

Senator HUMPHREY. Well, for those parents who are out there feeling helpless and isolated, where can they get authoritative and scientific information? Is it available today in local bookstores? Are there organizations one can write to?

Dr. SCHUCHARD. No; it is not usually available in local bookstores. Ninety percent of the books out are pro-marihuana, and that is in the college libraries, the commercial bookstores, et cetera. However, the National Institute on Drug Abuse is doing much better in its presentation of materials. I think the American Council on Marihuana, a private organization which is hoping to function like the American Lung Association or the American Cancer Society, really is producing some terrific things. Our Pride office at Georgia State University has informational packets. Then there is the National Federation of Parents here in Washington.

In every State, there is some kind of a parents' resource group, whether it is just in someone's kitchen or in a State office, that can be tapped into to try to get the latest information. But we need to do a better job of providing good information.

The problem with writing for Federal publications is that they cannot keep up with the demand right now, and that is a sad commentary when that information may be a very helpful thing. If the Federal agencies could get out the 80-cent pamphlets, maybe they would not have to spend $25,000 to rehabilitate an addict somewhere down the line.

Senator HUMPHREY. Yes; is there an umbrella organization for these various parent groups—a national umbrella organization?

Dr. SCHUCHARD. Well, yes. Here in Washington, the National Federation of Parents for Drug-Free Youth wants to present a national voice for all the groups that are out there.

Senator HUMPHREY. Can one simply write to them in Washington and receive a response?

Dr. SCHUCHARD. Right, and they can put a person in touch with regional groups. As I say, there are groups in every State now, and we have had citizens from seven foreign countries write recently and ask for translation rights, for they are trying to start their own parent groups.

Senator HUMPHREY. Very good. Well, I want to thank you for your testimony and for the dialog we have had. I think it has been very useful. It has received some broadcast attention and I hope that will leverage your contribution considerably.

I want to thank you for coming; we appreciate your help.

The record will remain open for 15 days for the submission of additional material, and the subcommittee stands adjourned, subject to the call of the Chair.

[Whereupon, at 1:03 p.m., the subcommittee was adjourned, subject to the call of the Chair.]

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